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The Persistence of Food Security Status Across Generations[*]

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Abstract

The persistence of disadvantage across generations is a central concern for social policy in the United States. While an extensive literature has focused on income mobility, much less is known about the persistence of material hardship. Using the Panel Study of Income Dynamics, we estimate the intergenerational persistence of food insecurity. Childhood food insecurity is associated with at least 10 percentage points higher probability of food insecurity as an adult, with estimates varying by severity of childhood exposure, life-course timing, and accounting for endogeneity and underreporting. We explore potential mechanisms behind this persistence related to perceptions, behaviors, and human capital.

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I. Introduction

A major concern for public policy in the United States is the extent to which childhood income influences economic outcomes in future generations. Recent evidence has shown that income inequality is rising (Piketty, Saez, and Zucman 2018), absolute economic mobility — doing better than one's parents — is falling (Chetty et al. 2017), and yet relative economic mobility has remained stable (Chetty et al. 2014b; Lee and Solon 2009). Rising inequality and falling absolute mobility are complementary findings, while stable relative mobility suggests that policy successes in public education or safety net programs may have limited the negative effects of high inequality on upward mobility. However, little is known about intergenerational persistence of material hardship, much less the social and political mechanisms related to persistent hardship. Since the foundational work of Becker and Tomes (1979; 1986), most intergenerational studies have focused on comparisons of income measures for parents and children, yet measures of consumption and material hardship are particularly relevant for understanding the role of policy interventions to support families rising out of economic disadvantage. In particular, food security is a critical measure of family well-being that has testable implications for the effects of childhood development on later adult outcomes as well as the effects of food assistance programs, which comprise one of the largest components of the U.S. safety net. Food insecurity is a fundamental issue for health, well-being, and policy (see Gundersen, Kreider, and Pepper 2011), and given the prevalence of childhood food insecurity, potential long-run consequences warrant greater attention to better understand private and public investments in nutrition (Gundersen and Ziliak 2014).

This study provides the first point estimates of the intergenerational effects of food insecurity.[1] Policymakers and researchers have long been interested in the ways socioeconomic

[1] Gundersen, Kreider, and Pepper (2018) use partial identification to estimate bounds on the intergenerational transmission of food insecurity, and McDonough and Millimet (2024) similarly use a bounds approach to transition

status is passed from one generation to another, and recent advances have extended beyond standard measures of income mobility (Black and Devereaux 2011; Solon 1999). For example, new studies have documented the intergenerational persistence of wealth (Charles and Hurst 2003; Fox 2015; Scholz and Levine 2004; Wolff 2002), health (Black, Devereaux, and Salvanes 2007; Currie and Moretti 2007; Halliday, Mazumder, and Wong 2021), consumption (Charles et al. 2014; Waldkirch, Ng, and Cox 2004), education, (Carneiro, Meghir, and Parey 2013; Magnuson 2007; Oreopoulos, Page, and Stevens 2006; Page 2006), and welfare use (Hartley, Lamarche, and Ziliak 2022). The question addressed here is how childhood food insecurity is related to the probability of food insecurity for the child as an adult.[2] Experiencing food insecurity means that a household reports lacking access to enough food or the right kinds of food because of financial constraints. While this measure is subjective, it is also well-established as a strong correlate of health and well-being (Gundersen and Ziliak 2015; Frongillo et al. 2017). Food security status can be correlated across generations primarily because of correlations in income or earning ability; however, plausible causal pathways may exist that have implications for effective policy intervention. For example, food insecurity persistence could result from lower nutritional intake during childhood, leading to lower human capital development. Another example may be patterns of food acquisition, budgeting, or preparation learned during childhood that may differ in food insecure versus food secure households, as different families engage in different resource management strategies. About 4 in 10 American children experience poverty at some point before age 18

probabilities across generations. In a parallel study to this one, Hamersma and Kim (2025) use education as a potential mediator to identify intergenerational food insecurity correlations.

[2] The broader literature on economic mobility has focused on relative measures such as the intergenerational elasticity (IGE) or rank-rank slope within a given distribution of income or wealth (notably Chetty et al. 2014a, among others). Alternative measures with more relevance for upward mobility out of poverty include the conditional transition probability and directional rank mobility (Bhattacharya and Mazumder 2008).

(Ratcliffe 2015), yet the long-run effect of their poverty experience may depend on whether families are equipped to smooth consumption when disposable income runs low.

Food insecurity is also more than an income-poverty condition. In 2019, approximately 12.5 percent of children under age 18 lived in families with economic resources below the Supplemental Poverty Measure (SPM) threshold (Fox 2020).[3] For the same year, 14.6 percent of children lived in food-insecure households (Coleman-Jensen et al. 2021). However, Wight et al. (2014) show that the risk of food insecurity remains high at around 30 to 45 percent for households with economic resources between 1 and 2 times the SPM threshold, or 10 to 15 percent for households between 2 and 3 times the SPM threshold, which they estimate conditional on demographics, employment, and education, among other factors (see also Gundersen, Kreider, and Pepper 2011; Gundersen and Ziliak 2014). U.S. food insecurity from 1998 to 2007 averaged around 17.9 percent for families with children until the Great Recession when it reached as high as 23.2 percent, an increase of about 30 percent that remained high 5 years after the recession's end (see Figure 1). Trends in poverty and food insecurity tracked closely until the Great Recession, when food insecurity increased and the SPM poverty rate continued on the same trend line. In part, this divergence during a time of heightened need reflects the fact that SPM poverty status considers a family's total resources, which includes cash transfers and the value of in-kind transfers such as Supplemental Nutrition Assistance Program (SNAP, or food stamps).[4] During the Great Recession, families may have received increased public assistance that countered any decrease in earnings. Another reason that these measures may diverge is that poverty rates are income-based

[3] The SPM definition of poverty is often used by the research community because its needs threshold is adjusted for contemporary family structures and geographic costs, and also because it accounts for a more robust definition of family resources, with a family's total economic resources determined after taxes, transfers, and work-related and medical expenses are accounted for.
[4] Note, however, that despite receiving food or cash assistance, most children receiving benefits are far more likely to experience food insecurity relative to those not receiving benefits.

indicators of well-being and not direct measures of material hardship or deprivation (see, e.g., Dhongde and Haveman 2017). Incomes may be low for some families who are otherwise doing well, for example, those using savings to smooth living expenses while forgoing income to pursue education or other socially beneficial goals. At the same time, other families may have above-poverty income yet experience hardship because a large proportion of that income is needed to service debts or support elderly or disabled family members (or poverty thresholds may simply be too low). For households that report some deprivation, such as skipping meals because money is tight, an indicator of food insecurity can provide a more direct measure of well-being. Food insecurity and other measures of material hardship provide another way to understand poverty in America, including how disadvantage may persist intergenerationally, as well as the potential role of social policy in disrupting this persistence.

[Figure 1 here]

The standard instrument for measuring food security is an 18-item questionnaire developed by the U.S. Department of Agriculture's Economic Research Service (USDA ERS).[5] USDA produces official statistics using its own nationally representative survey that is implemented in the December supplement to the Current Population Survey (CPS; see Coleman-Jensen et al. 2021), and the same questions have been implemented in other major public-use surveys such as the Panel Study of Income Dynamics (PSID; for comparisons with CPS measures, see Tiehen, Vaughn, and Ziliak 2020). The PSID is the only U.S. dataset that is applicable for intergenerational comparisons in this setting; it has fielded consistent questions on food security as early as 1997 (in its Child Development Supplement) and subsequently in select main family surveys. These data allow comparisons of food security in childhood over 4 survey years from 1997 to 2003, and again

[5] See the Appendix A1 for a full list of the questionnaire items.

in adulthood over 5 survey years from 2014 to 2021.[6] In this study, we compare food security across generations based on measures constructed from affirmative responses to food security questionnaire items, each indicating some degree of insecurity. In addition to using the raw score summing each of the affirmative responses, we also construct indicators for food security status by different thresholds of severity.

Across a variety of measures of food security status, the estimated intergenerational correlation of food insecurity ranges from 0.1 to 0.3 conditional on first-generation earnings, wealth, and family fixed effects. Persistence in food security in the United States is similar in magnitude to estimates of a 0.26 rank-rank slope for the persistence of self-reported health (Halliday, Mazumder, and Wong 2021), and it is about half the magnitude as persistence in earnings across generations (see Black and Devereaux 2011). Estimates based on policy-induced variation in childhood food insecurity imply that long-run persistence into adult food insecurity is caused by exposure to hardship and not just correlated factors common within families over time.

II. Conceptual Foundations and Methodology

Economic approaches to measuring the persistence of economic status across generations draw mainly on Becker and Tomes' (1979; 1986) human capital model.[7] This model is commonly used to explain parental investment in children based on a utility function that accounts for the children's future economic outcomes. The empirical approach in the literature typically identifies a reduced-form effect of the parent's outcome on the child's outcome as an adult, where the

[6] The Child Development Supplement was fielded in 2019, yet the surveys were delayed given the COVID-19 pandemic. When completed, many families were resurveyed again in 2020 providing another set of food security question responses.

[7] Note that much of the literature that follows this tradition refers to economic mobility, whereas the term persistence represents the same concept yet focuses on the lack of mobility, as is the context for food insecurity across generations. Also, the economics literature often refers to intergenerational dynamics as *transmission* from one generation to the next, though we frequently refrain from that usage here in order to be more abstract about the long-run processes related to persistence without assumptions rooted in a specific sociological theory.

persistence mechanism is related to some unobserved parental investment or child learning. For example, nutritional intake is a specific investment for healthy child development and skill formation that affect long-run labor outcomes (Duncan et al. 1998; Elango et al. 2016; Heckman and Mosso 2014; Ziol-Guest et al. 2012). Also, if a child experiences food insecurity, then this environmental exposure may reinforce certain behavioral patterns. Does the family skip meals or find ways to make food stretch? Is it acceptable to visit food pantries, receive support from friends, or take up public assistance? Based on a given set of family experiences, childhood food insecurity might have a direct effect on later food insecurity beyond the mechanical pathway of intergenerational correlations in income or wealth (Drèze and Sen 1989; Lindbeck, Nyberg, and Weibull 1999). With this focus on the outcome of food insecurity, the question is whether lacking enough food or the right kinds of food becomes a persistent pattern across generations.

Food security is a latent outcome, so modeling the transmission of food insecurity across generations requires defining either an indicator for a family's food security status or an estimate of the underlying measure that is not observed. A food security status indicator is typically constructed from the raw score total based on household responses to the 18-question USDA survey instrument.[8] The first 10 questions are specific to adults in the household, and the last 8 questions are directed toward children if any are present. Each of the 18 questions is recoded as a 1 if the response indicates some degree of food insecurity, and a 0 otherwise. Families with a raw score of 0 to 2 are considered food secure, although any positive response could be classified as marginal food insecurity. Families with a score of 3 or more are considered low food secure, and a status of very low food secure corresponds to a score of 6 or more for childless households or 8 or more for households with children (since households with children have a higher possible score

[8] See Coleman-Jensen et al. (2021) for an overview. For reference, the 18 questions are listed in the appendix.

out of 18 questions instead of 10). These score thresholds are chosen to fit the underlying model of latent food security. Since the raw score is derived from 18 separate questions, each with an inherently different measure of severity, the latent measure of food security can be estimated using methods from item response theory, which relies on strict distributional and exogeneity assumptions (see, e.g., Arteaga and Wilde 2023; Rabbitt 2013; 2018; Rasch 1960). However, the total raw score is a sufficient statistic for characterizing the latent food security of a household; even though any individual responses may not be equivalent in terms of severity, the total score creates an envelope of responses indicating increasing severity.

Following the Becker-Tomes framework and an empirical literature on intergenerational dependence (see Black and Devereaux 2011), we consider a statistical model for early adulthood outcomes (food security or potentially related outcomes) relative to childhood food security measures. In the notation that follows, we focus on individuals from childhood into adulthood, yet the food security variables are household-level measures that characterize the individual's experience in these time periods. The adult outcome F_{ist} of individual i in state s at time t can be expressed as

$$F_{ist} = \alpha + \beta F_{i,t_0} + \boldsymbol{w}_i'\gamma + \boldsymbol{x}_{ist}'\theta + \phi_i + \mu_s + \kappa_t + \varepsilon_{ist}, \tag{1}$$

where F_{i,t_0} is the individual's food security corresponding to the childhood exposure time period t_0, $\boldsymbol{w}_i$ is a set of time-invariant controls, $\boldsymbol{x}_{ist}$ is a set of time-varying individual and state-level control variables, along with family (ϕ_i), state (μ_s), and year (κ_t) fixed effects, and ε_{ist} is an idiosyncratic error term. The hypothesized value for the parameter of interest is a non-negative transmission effect of intergenerational food insecurity, $\beta \geq 0$. The key question is how childhood food insecurity transmits to adult food insecurity, which the model addresses by using indicator variables for adult food security status, $F_{ist} \in \{0,1\}$, or by using continuous outcome measures such as the food security raw score.

When interpreting the parameter of interest from the model in equation (1), a primary result is the degree to which food insecurity persists across generations without conditioning on any covariates. This general parameter for persistence can be thought of as a descriptive measure of the total intergenerational correlation inclusive of the direct transmission effect of childhood food insecurity and any other related factors. In other words, estimating equation (1) addresses the question of how much food security persists across generations without separating out any potentially causal mechanisms from other correlated factors, such as earnings ability or network effects common within the family. Comparing the unconditional and conditional correlations also presents the opportunity to decompose the explained generational pathways for better understanding how family dynamics impact long-run outcomes. Socioeconomic measures of persistence, or economic mobility, have drawn considerable attention within the literature. For more depth, Björklund and Jäntti (2020) discuss how an unconditional persistence parameter is complementary with other approaches to understanding the influence of family background, namely estimating a causal effect of parental resources.

If there are pathways through which childhood food insecurity might directly cause long-run food insecurity in adulthood, then understanding this process is relevant to families, researchers, and social policy. In particular, social policy designed specifically to ameliorate food insecurity in childhood — such as SNAP, school meals, and summer programs — could imply greater long-run benefits in future generations. Identifying a causal intergenerational parameter requires distinguishing the effects of childhood food insecurity separately from unobserved heterogeneity that may be related to earning ability or financial security across generations. If food security during childhood is correlated with some fixed within-family endowment that is unobserved, $\mathbb{E}[F_{i,t_0}\varepsilon_{ist}] \neq 0$, estimates of the intergenerational parameter for childhood food insecurity would be biased. One way to account for any unobserved time-invariant family endowment would be to control for family fixed effects, such as any common effects linked generationally through a grandparent. Therefore, beyond controlling for fixed and time-varying characteristics for each individual, we include controls for below-poverty family earnings as well as family wealth and equity during childhood,[9] and we also include family fixed effects, ϕ_i in equation (1), that are common to siblings and cousins with any shared grandparents, which is facilitated by the long panel design of the PSID following all descendants and family off-shoots from the original survey in 1968. The time-invariant exogenous controls in $\boldsymbol{w}_i$ include a quadratic of the parent's mean age during childhood, indicators for the individual's sex and race/ethnicity, as well as mean childhood below-poverty status and family wealth/equity. Additionally, the baseline set of time-varying exogenous controls in $\boldsymbol{x}_{ist}$ includes quadratics in the child-as-an-adult's and/or household head's age, indicators for number of family children (1, 2, 3, 4 or more), and state-level controls for the unemployment rate and the SPM poverty rate (see Fox et al. 2015; Nolan et al. 2016). We estimate conditional correlations according to equation (1) by ordinary least squares (OLS), and assuming within-family autocorrelation for the error term, we cluster our standard errors at the common sibling/cousin grouping level.

If the only confounding factor for identifying β is related to the persistence in earning ability or financial resources across generations, conditional on observed covariates and unobserved family fixed effects, then estimation of equation (1) provides consistent evidence for

[9] The poverty variable is the proportion of childhood years family earnings fell below the federal poverty line, and the wealth variable is the inverse hyperbolic sine of wealth and equity in order to account for zeroes or negative values. This transformation, equivalent to $\ln(x + (x^2 + 1)^{1/2})$, can be interpreted similarly to the natural log transformation given that it closely approximates $\ln(2x) = \ln(2) + \ln(x)$.

the long-run impact of childhood food insecurity. However, other potential biases may be relevant in the intergenerational context, such as observation-window bias or life-cycle bias, discussed below, and endogeneity may still be an issue because of measurement error in defining food insecurity as well as the possibility of time-varying unobserved factors correlated with the food insecurity in both generations. After describing these issues in more detail, we propose an approach using state-level policies during childhood as instruments to identify exogenous changes in exposure to food insecurity.

The timing of outcome measurement is important to interpreting the relevance of an intergenerational parameter estimate. One potential bias is related to the 'window problem' when observing outcomes for limited ranges of the full lifetimes of each generation (Grawe 2006; Wolfe et al. 1996). In the income mobility literature, the ideal intergenerational parameter would be closely related to the permanent income concept. Income can vary considerably over a lifetime, so using only one observation year in each generation, for instance, would provide a noisy proxy for average income over a lifetime (see Solon 1992). In the food security context, childhood exposure to one year of marginal food security could be quite different from exposure to insecurity throughout childhood. Thus, our analysis explores broad measures of childhood exposure contrasted with intensity of exposure from repeat observations. Given that our interest is the degree to which childhood exposure to food insecurity matters in the long run, examining differences between the effects of any food insecurity relative to mean exposure in childhood provides more insight into the implications of families unable to perfectly smooth consumption, especially when childhood food insecurity may be hard to observe in self-reported survey data.

Another source of bias depends on the relative timing of the generational windows of observation within the life cycle. That is, if the parent's generation is observed later in life, incomes may be higher and food insecurity prevalence lower; however, if the child is observed earlier in life as an adult, then the implications may be reversed.[10] This scenario is often referred to as life-cycle bias (Haider and Solon 2006; Lee and Solon 2009), and it is common given data constraints on the length of panel observations for both parent and child. For this study, the timing of the first-generation observation is restricted to the individual during childhood ages 0 to 17, which will necessarily restrict the adult observation years to under age 35 based on the current data available. Lee and Solon (2009) suggest implementing an age adjustment in the estimation to address life-cycle bias. The childhood period in this study is well observed in terms of spanning early to adolescent childhood, though it is limited to 4 biennial observations at the yearly level as opposed to a more detailed description of the intensive margin of exposure. Then, for the outcome period, focusing on transmission of food insecurity into early adulthood is valuable for understanding an important time period of early career and family decisions, and this point in the life cycle is arguably a primary interest for studying economic hardship and social policy. Still, we return to life-cycle adjustments following Lee and Solon (2009) as a sensitivity check.

Lastly, there may be remaining endogeneity challenges for understanding a causal effect of childhood food insecurity, through unobserved time-varying determinants of adult food insecurity correlated with childhood food insecurity as well as measurement error in determining food insecurity. Relevant unobserved factors for food insecurity identified in the literature include behaviors, or coping strategies, like purchasing the cheapest foods available or making difficult trade-offs in meeting medical or utility bills (Gundersen, Engelhard, and Hake 2017), confidence in financial management skills (Gundersen and Garasky 2012), or levels of social capital (Martin

[10] The true relationship between food security over the life cycle is not well established in the data. Tiehen, Vaughn, and Ziliak (2020) show that age profiles in food security status are not consistent comparing estimates using data from the Current Population Survey relative to using the Panel Study of Income Dynamics.

et al. 2004). Further, potential measurement error in self-reporting may systematically understate actual food insecurity. For example, identical families with the same food budget and consumption may subjectively disagree as to whether they did not eat because there was not enough money for food in the last 12 months, and survey respondents may also tend to avoid affirming food hardships interpreted as socially undesirable, particularly items associated with greater severity of insecurity or insecurity involving one's children (see Gregory 2020). In terms of measuring childhood food insecurity, a broad indicator for any insecurity across multiple years offers the advantage of increased sensitivity for detecting any hardship while trading off the disadvantage of losing information on the intensity of exposure (see Bollinger and David 2005).

Instrumental variable (IV) methods address both forms of endogeneity: time-varying unobserved factors and underreported childhood hardship. The key for identifying the causal effect of food insecurity is isolating the exogenous variation in exposure that is explained by instruments given that the instruments are uncorrelated with food security in early adulthood. Despite SNAP being a federal program, implementation occurs at the state level with key policies and practices open to administrative discretion since welfare reform in 1996. The food assistance literature has shown that more recent SNAP policy variation influences take-up (Jones et al. 2022; Ziliak 2015), and this state-level public policy variation has been used to identify SNAP participation effects on addressing food insecurity and health issues (see, for example, Almada, McCarthy, and Tchernis 2016; Heflin and Ziliak 2024; McKernan, Ratcliffe, Braga 2021; Ratcliffe, McKernan, and Zhang 2011; Yen et al. 2008). We consider a set of instruments employed in the SNAP policy index described in Stacy, Tiehen, and Marquardt (2018) drawn from the Economic Research Service SNAP Policy Database, and we include real SNAP benefit standards and Temporary Assistance for Needy Families (TANF) benefit standards over time (for a similar approach, see Heflin and

Ziliak 2024). For the SNAP policy index variables used in our main analysis, we include whether noncitizen adults are fully eligible for SNAP, whether SNAP applications are accepted online, and the proportion of SNAP units with a 1–3 month recertification period, which are expected to be relevant to childhood food insecurity with the best justification for exclusion in the adulthood outcome equation. However, under the hypothesis that all 10 index variables are valid instruments, in addition to the food and cash assistance benefit standards, we explore the sensitivity of our two-stage least squares (2SLS) estimates for sets of 5, 7, 9, and 12 instruments.[11] We test the first-stage following Montiel Olea and Pflueger (2013) to account for potentially weak instruments for the case with clustered standard errors, and we discuss issues for inference in this setting.

The policy instruments are constructed as the mean values during childhood. These policies are assumed to influence childhood food security by making public assistance to meet food needs more available. Because these policy instruments vary by state and time, we also control for the child-as-an-adult's contemporaneous measures of the same policies in order to assure that the childhood instruments are excludable from the second-stage estimation. Thus, we consider a first stage for childhood food insecurity as

$$F_{i,t_0} = \zeta + \boldsymbol{z}'_{i,t_0}\pi + \boldsymbol{w}'_i\psi + \boldsymbol{q}'_{ist}\omega + \chi_t + \upsilon_{ist}, \tag{2}$$

where $\boldsymbol{z}_{i,t_0}$ represents the set of childhood instruments. To account for possible within-state policy dependence over time, $\boldsymbol{q}_{ist}$ is a set of time-varying exogenous controls that includes the

[11] The other available policy index instruments include: an indicator for SNAP broad-based categorical eligibility; whether states use simplified reporting for household changes; an indicator for whether a state excludes at least one but not all vehicles for the SNAP asset test; whether there is a statewide requirement of fingerprinting for SNAP applicants; total state-level SNAP outreach spending in inflation-adjusted per-capita dollars; an indicator for whether a state excludes all vehicles from the SNAP asset test; and, the proportion of SNAP benefits issued by electronic benefit transfer (EBT). The SNAP policy index uses an alternative outreach variable because the spending measure has mixed results in the literature, yet the alternative they use — whether the state had a federally funded radio or TV ad campaign — does not vary within our study period because it started in 2004 after our childhood window and ended in 2012 before our adulthood window.

contemporaneous adulthood measures of the childhood policy instruments in addition to the controls in $\boldsymbol{x}_{ist}$ used in equation (1). Gregory, Rabbitt, and Ribar (2015) document that the food assistance literature using IV methods typically results in low precision, and the identifying policy variation for equation (2) may be noisy when also including state fixed effects, or underidentified with the inclusion of family fixed effects. We acknowledge this limitation, omit family fixed effects and state fixed effects in our main IV estimation, and we explore the sensitivity for the inclusion of state effects. The second-stage equation is given by

$$F_{ist} = \eta + \beta_{IV}\hat{F}_{i,t_0} + \boldsymbol{w}_i'\delta + \boldsymbol{q}_{ist}'\lambda + \xi_t + \nu_{ist}, \tag{3}$$

where we estimate the second stage using the same exogenous controls used for $\boldsymbol{w}_i$ and $\boldsymbol{q}_{ist}$ in the first stage along with year fixed effects. The first-stage childhood policy instruments are assumed to be excluded from the second-stage equation (3) conditional on the contemporaneous state policies in adulthood, though we test the sensitivity of these estimates to including state effects.

One more potential bias is the likely underreporting of food insecurity in the dependent variable for early adulthood. Following Bollinger and David (1997) and Hausman, Abrevaya, and Scott-Morton (1998), parametric bias corrections would be easily applicable given estimates of the false-positive and false-negative reporting rates for food insecurity. Gregory (2020) suggests that the false-negative rate may be around 1 to 3 percent and the false-positive rate is approximately 0. Extrapolating from Gregory's results, an upper estimate of the false-negative rate may be as high as 10 percent. Without variation in the false-positive rate over time or other dimensions, the $\hat{\beta}$ estimates would be larger after adjustments by the approximate size of the assumed false-negative rate, where the standard errors also increase yet the p-values remain constant. Therefore, we suggest interpreting the conditional correlations and causal estimates as a conservative range for the expected effect of childhood food insecurity.

III. DATA

The Panel Study of Income Dynamics (PSID) is the longest-running longitudinal survey in the world. The PSID collects a wide range of individual and family characteristics as well as income, program participation, and expenditure measures, and it is the only data source that would allow a comparison of household food insecurity across generations.[12] For the first generation, we use four years of survey data that correspond to an individual's childhood before age 18. The first PSID questions on food security were implemented in the 1997 Child Development Supplement (CDS), which was randomly offered to a subset of PSID families with children ages 0 through 12. Subsequently, the next three main family surveys, fielded biennially in 1999, 2001, and 2003, included the same set of food security questions for all families. The next survey to include food security questions was the 2014 CDS, which was fielded to all children under age 18. Since these questions correspond to the household, individuals observed in this survey can include adults who were previously observed during childhood in the earlier food security surveys. The food security questions returned to the main family surveys for the following survey years: 2015, 2017, 2019, and 2021. The 2019 CDS experienced delays related to the COVID-19 pandemic, and many of the families were re-interviewed again in 2020 providing another set of food security responses.

The estimation sample is restricted to individuals who are observed as children under age 18 during the earlier survey years, 1997–2003, which corresponds to a cohort of individuals born from 1985 to 1997. These individuals are followed for all subsequent years in which their food security status is observable as an adult who is at least 18 years old and has started their own family unit, either by moving out or by childbirth. Further, we only use individuals observed in the core PSID subsamples: Survey Research Center (SRC) sample and Survey of Economic Opportunity

[12] Public-use version of these data were obtained via the University of Michigan Survey Research Center (Panel Study of Income Dynamics 2023).

(SEO) sample (see Brown 1996); core longitudinal sample weights are used throughout. We restrict the estimation sample to those with at least 2 observations of food security status in each time period, childhood and adulthood, and we only keep those who we are able to match to their siblings and cousins through a common grandparent. The multigenerational length of the PSID allows us to construct these family variables based on observing the grandparents in survey years before the food security modules were introduced.[13] The estimation sample consists of 1701 individuals with 6476 total adulthood observations, and the subsample of those who have children present in the household includes 916 individuals with 3376 observations. Of the 1701 main sample individuals, 1518 have either a sibling or cousin observed, where there are 818 unique sets of individuals with a shared-grandparent. Both the childhood period and the adulthood period observe each individual around 3.8 times on average.

Food security measures in the PSID are constructed based on the standard set of 18 questions used by the USDA, such as whether the family has skipped meals during the last 12 months. The food security questions are conceptually related to deprivation from lack of income, so it is not sufficient that someone indicates that they skipped a meal unless it was due to a lack of economic resources. The first 10 questions are directed toward adults in the household, and the last 8 questions are directed toward children if any are present. Thus, each childhood measure in our intergenerational context pertains to the scale from 0 to 18, and the early adulthood measures will either be 0 to 10 for adults without children or 0 to 18 for those with children present in the household. Each household has a raw score that totals the affirmative responses, that is, each

[13] This sibling-cousin effect conditions on time-invariant unobserved characteristics within families without absorbing too much variation as would a parent fixed effect. About 89 percent of individuals in the main estimation sample have at least one shared grandparent with another individual included in the estimation. For comparison, about 76 percent of sample individuals have a shared parent, which corresponds closely to an estimate of about 21 percent of mothers only having one child in 1994 (www.pewresearch.org/social-trends/2015/05/07/family-size-among-mothers).

question to which the respondent admits to some degree of food insecurity. Following standard category cutoffs established in the literature, we define three food insecurity indicators: marginal, low, or very low food secure (at least 1 affirmative response), low or very low food secure (at least 3 affirmative responses, also described as 'food insecure'), and very low food secure (at least 6 affirmative responses for households without children, or at least 8 for households with children). Whereas food security categories of high, marginal, low, and very low food secure are each mutually exclusive, we define our indicators inclusively across categories in order to estimate intergenerational effects for varying thresholds of severity. We also consider a definition for food-insecure children, which is distinct from children living in food-insecure households. Coleman-Jensen et al. (2021) classify food-insecure children — or food insecurity among children — for households reporting at least two affirmative responses to the 8 questions focused on children, items 11–18.

Table A1 in the appendix provides descriptive statistics for the estimation sample by generational life stage: childhood and adulthood (as well as adulthood with children present in the household). Individuals' childhoods were associated with higher real family earnings, about $59,800 in 2019 dollars, relative to their own family earnings in early adulthood, about $49,300. The sample was also more likely to be food secure in childhood (82 percent) relative to early adulthood (72 percent). Table A1 also reports descriptive statistics for similar adults who did not meet the sample criteria because of an insufficient number of generational observations or missing key variables of interest. Those nonsample individuals had about 8 percent lower earnings and were about 5 percent less likely to be food secure, though about half of them had missing earnings or food insecurity. Therefore, these data may lead to underestimates of the effects of childhood food insecurity since they reflect a relatively more secure subsample socioeconomically.[14] On average, when individuals reach early adulthood, their families have younger heads of household and are less likely to be married or have children, yet they are more likely to have more than a high school education. Early adulthood relative to childhood is also associated with less economic resources, higher prevalence of SNAP participation and food insecurity, and higher poverty rates if children are present. The average ratio of food spending relative to needs according to the USDA Thrifty Food Plan (TFP) is higher in early adulthood except for those with children present who are more likely to spend below their needs.[15]

For the estimation sample, 81.6 percent of observation-years in childhood are represented by food-secure families, while this drops in early adulthood to 71.8 percent, or 69.1 percent among those in early adulthood with children present in the family. Very low food security increases from 2.6 percent in childhood to 7.2 percent in early adulthood (6.3 percent if children present). Partly, the change in food security status (and economic status, more generally) is related to younger household heads in this transition to adulthood period, yet it is also related to changes in economic status trends over time. Figure 1 shows trends in poverty status and food security status among children from 1997 to 2021. While food security rose during the Great Recession and stabilized to previous levels by around 2015, trends in PSID samples show higher rates of insecurity post-Great Recession than rates from survey years 1997 to 2003. Differences between official food insecurity

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[14] The rates of any childhood marginal, low, or very low food security are similar between the estimation sample, 37.3 percent, and a similar birth cohort not meeting sample selection criteria, 33.6 percent. The mean childhood exposures for marginal, low, or very low food security in these samples are 19.0 percent and 18.1 percent, respectively.

[15] The TFP corresponds to basic nutrient intake needs that vary by individuals' age, sex, and family size. Based on evidence of the importance of the real purchasing power for food spending and food assistance, we adjust the dollar amounts of food needs using state-year price indices (Basu, Wimer, and Seligman 2016; Bronchetti, Christensen, and Hoynes 2019; Ziliak and Gundersen 2016). For USDA food plans by month, see https://www.cnpp.usda.gov/USDAFoodPlansCostofFood. Consumer price indices for urban consumers by region and Census division are used to adjust values by year and location. For the expenditure amount, we include food spending for consumption at home as well as away or delivery, and we also include the in-kind value of SNAP benefits.

rates in the CPS and rates in the PSID are well documented by Tiehen, Vaughn, and Ziliak (2020), and as Figure 1 shows, PSID rates are lower, especially in the earlier years. Because the PSID follows families over many years, the longitudinal sample tends to include families who are economically better off. To the extent that childhood food insecurity is underrepresented in the data, intergenerational estimates may understate the true persistence.

IV. PERSISTENCE IN FOOD INSECURITY

A. Descriptive Persistence Within Families Over Time

We begin with descriptive evidence on the persistence of food insecurity within families over time by showing year-by-year correlations to an initial observation from the 1997 CDS survey. The results in Figure 2A correspond to correlations estimated for food security status interacted by year conditional on a set of exogenous covariates.[16] During the first years following each child, the within-family persistence of food insecurity is around a correlation of 0.25. At nearly 20 years after the initial period, the individuals are aged 18–34 and some have started their own families by this time. In 2014, the food security correlations are around 0.15, and there is little difference in correlation by the degree of food security indicated by status. As the years progress from 2015 to 2021, the difference between correlations of food insecurity and very low food security widen. These estimates do not condition on the child entering into adulthood by starting a new family unit, so the correlations should be interpreted as a descriptive look at persistence over time.[17]

[Figure 2 here]

[16] For these correlations, we exclude measures of earnings, wealth, and family fixed effects.
[17] We use weights throughout to account for potentially endogenous heterogeneity related to oversampling low-income and racial minority families (for detailed discussion on this practice, see Solon, Haider, and Wooldridge 2015).

As a comparison, Figure 2B shows alternative measures of economic status by contrasting persistence in family earnings versus food spending relative to needs. These estimates rely on three-year averages for the initial reference period, based on survey years 1995–1997. Persistence in family earnings starts at a higher magnitude around 0.7 and decays faster than persistence in food insecurity (toward levels around 0.4). Food spending correlations drop off precipitously and remain flat despite levels still around 0.1 by 2021. The likelihood of food spending below needs, 'low food spending', begins fairly low and falls below 0.05 by the end of the time period. Note that Gundersen and Ribar (2011) find limited associations between low food spending and food insecurity, yet we return to food spending as an outcome later to investigate whether childhood insecurity is related to long-run spending choices. The change in persistence for self-reported food insecurity in Figure 2A was a decrease of about half, a flatter gradient relative to changes in earnings correlations. While certain economic shocks are expected to be transitory, which would correspond to declining persistence of economic hardship over time, food insecurity appears to have longer-lasting implications for childhood and early adulthood hardship.

B. Unconditional and Conditional Estimates of Persistence Across Generations

To better understand how childhood food insecurity influences the next generation, we estimate equation (1) both unconditionally for a general measure of persistence as well as conditionally on determinants of food insecurity, childhood family earnings and wealth, and family fixed effects. In Table 1, panel A shows results for the full estimation sample and panel B shows results for the subsample of those who have children present in the household. Each point estimate is from a separate regression where the early adulthood outcomes are arranged by column and the rows present alternative measures of food security in childhood.

Any marginal, low, or very low food security in childhood is associated with an additional 1.096 (0.182) responses in the food security raw score, which corresponds to a 0.772 (0.407) higher raw score conditionally, with cluster-robust standard errors shown in parentheses. Across outcomes, correlations of this low-threshold measure of childhood food insecurity fall between 25 to 50 percent in magnitude once conditioning on rich measures of family background. Experiencing marginal, low, or very low food security in adulthood is associated with 20.1 (2.5) percentage points higher chances if experienced in childhood, or 9.9 (6.2) percentage points conditionally. Note that this unconditional correlation of 0.2 is approximately the magnitude found by Halliday, Mazumder, and Wong (2021) for self-reported health. The effects of having any marginal, low, or very low food security in childhood are similar to exposure to low or very low food security in most cases. Once conditioning on childhood family earnings, wealth, and family fixed effects, any transmission pathway is estimated imprecisely yet with meaningful economic significance. Many of these conditional estimates are borderline cases of statistical significance at the 10-percent level. One exception is that any exposure to very low food security in childhood is strongly associated with adulthood insecurity across outcomes. The more severe measures of childhood exposure imply greater chances of adult insecurity. However, the effects of any exposure to child-specific insecurity appear less influential, which is an unexpected finding. It may be that parents are more reluctant to report child hardships (see Gregory 2020), or that parents underestimate the extent to which household insecurity affects children (Coleman-Jensen et al. 2021).

Patterns in panel B for those with children present are similar in general, yet the conditional effects are quite larger and nearly every estimate is statistically significant at the 5-percent level. To use the example of childhood food insecurity — that is any low or very low food security in childhood — the conditional effects in early adulthood imply about 3 points higher in the raw score (enough to classify a household insecure), or more than 40 percentage points higher chance of food insecurity as an adult with a child present.

[Table 1 here]

Defining childhood food insecurity in terms of any exposure offers a useful summary measure, yet it may understate the degree to which the intensity of exposure matters in terms of duration in years. The majority of food-insecure households experience this condition recurrently throughout the year, with at least 1 in 5 experiencing it nearly every month (see Coleman-Jensen et al. 2021; Nord, Andrews, and Winicki 2002). Therefore, in Appendix Table A2, we show intergenerational estimates using mean exposure during childhood, and additionally, we include the mean food security raw score during childhood as another measure of the intensity of exposure.[18] As noted before, the raw score is a sufficient statistic for describing the underlying latent measure of insecurity.[19] In Appendix A2, we explore the relationship between any exposure to childhood food insecurity and measures of severity of exposure, the long-run implications for adult insecurity, and alternatively the role of continuous measures of insecurity (Tables A4–A7).

C. The Role of Income and Timing of Exposure

Even though our conditional models include rich controls for family background, it is worth considering the degree to which these OLS estimates are informative beyond income status,

[18] A parallel set of results based on aggregated individual outcomes in adulthood (for both any exposure and mean exposure in childhood) is available in Table A3 in the appendix.

[19] While all of these childhood variables are measured on a yearly basis, the raw score is also highly correlated with measures of within-year frequency of food hardship, as well. In the appendix, Figure A1 uses CPS data to show that hardship frequency, whether over the past year or past 30 days, is increasing with the number of affirmative question responses to the food security module. Therefore, the correlations by this raw score offer a better representation of the long-run effects of more intense exposure in childhood.

which is a strong determinant of food insecurity.[20] However, recall that evidence has shown that income itself is not completely protective against food hardship, even conditional on relevant factors (see Wight et al. 2014). We add to this evidence in Figure 3 — panels A(i) and B(i) — by illustrating how intergenerational correlations vary by restricting samples according to different thresholds of earnings relative to the federal poverty line in childhood. In panels A(ii) and B(ii), we show that food insecurity exposure is not fully explained by very low earnings, which is also seen in a literature examining overlaps between childhood poverty and hardships (see, for example, Hartley, Toppenberg, and Dhongde 2024). The panels in Figure 3A shrink the estimation sample by descending thresholds of earnings-to-needs: as the sample becomes more and more predominantly only families with lower average earnings-to-needs, the correlations remain generally stable and do not diminish toward zero. For panels in Figure 3B, the lowest-earning families are successively excluded according to ascending thresholds, and here we see that dropping observations with mean earnings-to-needs ratios below 1 or even below 2 does not diminish the intergenerational estimates; however, the coefficients do fall when excluding roughly those below 3 times the federal poverty line because of the much lower rates of insecurity in that population. These results roughly align with Wight et al.'s findings of the conditional risk of food insecurity through 300 percent of the poverty threshold, and the strength of the association across generations downplays what role income might play in influencing the food security effect interpretations.

[Figure 3 here]

[20] See Table B1 in the appendix for a decomposition of the unconditional persistence of food insecurity explained by factors such as age profiles, childhood years in poverty, family wealth and equity, or family fixed effects (for reference on the decomposition, see Gelbach 2016).

Given these results on exposure, intensity, and a potentially direct pathway for persistent food security across generations, another important aspect of exposure is whether the timing during childhood matters, and what that informs about a persistence pathway. Almond and Currie (2011) discuss the fetal origins literature that convincingly establishes the long-run consequences of nutrition deficiencies *in utero*. By contrast, food security in early adulthood may be more determined by learning management and coping strategies in later childhood years. To explore the role of timing, Figure 4 shows separate estimates of indicators at three age ranges of childhood for different levels of severity for food insecurity, each relative to the outcome of marginal, low, or very low food security in adulthood. As the childhood measure increases with severity, the timing in childhood tilts much more toward adolescent years where learning behaviors may be more important relative to the developmental pathways suggested by those earlier childhood years. Qualitatively, Popkin, Scott, and Galvez (2016) find that teenagers experience more food hardship than they acknowledge publicly, sometimes going hungry so that younger siblings do not, while also bearing the mental stress of managing without sufficient resources. Table B2 in the appendix provides detailed estimates by childhood age ranges of exposure.

[Figure 4 here]

V. EXTENSIONS ON CAUSAL FOOD SECURITY PATHWAYS ACROSS GENERATIONS

The conditional OLS evidence supports the hypothesis of direct intergenerational food security effects under the assumptions that unobserved factors contributing to food security in both childhood and adulthood are adequately accounted for by childhood poverty status, wealth, and family fixed effects, among other controls. However, other unobserved factors may still matter if these conditional correlations remain confounded by time-varying determinants such as coping mechanisms or financial management practices, as well as by nonrandom measurement error where families tend to underreport severity of food insecurity. In this section, we explore IV methods to address any remaining endogeneity while also exploring potential mechanisms related to persistent food insecurity across generations.

A. Instrumental Variable Estimates of Intergenerational Food Insecurity

We use policy-induced changes in childhood food insecurity to better understand the potential for causal pathways to persistent food insecurity in adulthood. For our IV approach, we focus our estimates on our broader measure of any childhood marginal, low, or very low food security. This measure has the benefit of easier identification in the first stage because it covers all children who are most likely to be exposed to food insecurity. Given any indicator of food insecurity during childhood, the instruments identify variation induced by exogenous state-level policies that are conditionally independent from one's food insecurity in adulthood given contemporaneous controls for those same policies in the second generation. The first stage thus provides a sense of how much food insecurity is shifted exogenously while also accounting for the propensity to underreport. The results are also straightforward to interpret as the local average treatment effect of any childhood insecurity, where, on average, those with any marginal, low, or very low food security in childhood spend half of their years in that status with a mean yearly food security raw score of 2 affirmative responses. Other work has shown that marginal food security can be as informative as food insecurity for explaining childhood outcomes (see Winicki and Jemison 2003). For simplification, given that all estimates in this section are based on any childhood marginal, low, or very low food security, we use the shorthand description of childhood food insecurity when discussing IV results.

Table 2 shows 2SLS estimates of intergenerational food insecurity effects for the main outcomes of early adulthood food security status. Before discussing point estimates and inference, note that our estimates exhibit weak identification in the first stage (which is unsurprising given the IV literature identified by SNAP policy variation; see Gregory, Rabbitt, and Ribar 2015), although we reject the null hypothesis that our first stage is underidentified and we fail to reject valid instruments in the overidentification tests. We find a heteroskedasticity-corrected F statistic of 16.791 for the instrumental variables in the first stage assuming no autocorrelation, yet the appropriate test for weak instruments in our setting with clustering is the effective F statistic proposed in Montiel Olea and Pflueger (2013), which is 2.995. While this test indicates weak instruments, Cruz and Moreira (2005) suggest that the F statistic alone is not an effective qualifier of reliable identification, which should rather be determined using weak-IV-robust methods for estimating conditional bounds on the point estimate (see also Andrews, Stock, and Sun 2019; Keane and Neal 2023). Further, in over-identified models, the literature supports the reliability of evidence in the case of many instruments for a single endogenous indicator variable, even with weak first stage estimates (see Angrist and Pischke 2008; Cruz and Moreira 2005).

[Table 2 here]

In this setting with weak instruments, the 2SLS standard errors are known to be biased and unreliable for inference, so we report point estimates along with a cluster-robust p-value for $\hat{\beta}$ based on the Lagrange multiplier K statistic (see Kleibergen 2005). Column (1) of Table 2 shows that childhood food insecurity implies an additional 1.934 [0.013] affirmative responses to the food security raw score in early adulthood, with the p-value shown in brackets. The intergenerational effects of childhood food insecurity on indicators of early adulthood status are 0.369 [0.054], 0.237 [0.112], and 0.133 [0.052] for increasing thresholds of severity from marginal, low, or very low food secure in column (2) to very low food secure in column (4). The magnitudes of these estimates are approximately around the upper 95-percent confidence limit for conditional OLS estimates in Table 1.

These estimates are also robust to estimation by limited information maximum likelihood (LIML) along with corresponding cluster-robust p-values constructed based on the conditional likelihood ratio (CLR) test (see Moreira 2003; Moreira and Moreira 2019).[21] Table C1 in the appendix shows that the main point estimates by LIML are slightly larger in magnitude relative to those by 2SLS, and the CLR p-values are nearly equivalent or smaller. Estimates for those in early adulthood with children present imply generally larger effect sizes, as seen in the conditional OLS results, yet for these smaller samples the first stage is underidentified. For further sensitivity analysis of these IV results, in Figure C1 of the appendix we show confidence regions for the hypothesis $H_0: \beta = \beta_0$ across a range of values for β_0 based on the weak-IV-robust K test and CLR test relative to the Wald test assuming strong first-stage identification, and we also include a weak-IV-robust J test of valid overidentifying restrictions. In Appendix Figure C2, we also test the consistency of our results when considering increasingly overidentified models with sets of instruments ranging from 5 included in our main analysis up to 12 using all available measures in the SNAP policy index along with benefit standards for SNAP and TANF, where we additionally show evidence that our point estimates are robust to the inclusion of state fixed effects despite some loss in precision. Note that Figure C2 assumes confidence intervals based on the standard errors shown in Table 2, yet in the weak-IV-robust case the confidence intervals are not symmetric and the corrected lower bounds are generally greater than shown. Further, we explore potential life-cycle-bias following Lee and Solon (2009) in Appendix Table D1, which shows that the

[21] LIML estimates have advantages at addressing weak-IV bias in small samples while also being median-unbiased in overidentified models, so finding similar point estimates and magnitude of standard errors lends further credibility to our main estimates (Angrist and Pischke 2008).

adjusted magnitudes of 2SLS estimates are about 33 to 44 percent smaller than those in Table 2, though results remain economically sizable with effects of 1.2 points in the food security raw score or 25 percentage points in the probability of marginal, low, or very low adult food security.[22]

B. Potential Mechanisms for Generational Food Security Effects

To understand why childhood food insecurity persists into adulthood, we first look to the individual food security module items to see which responses are influenced more than others, as shown in Figure 5. The first block of questions regarding the household status appear to be more responsive to childhood food insecurity than items indicating greater severity.[23] Adults are more likely to worry about food running out or reporting that food did not last, yet there is no evidence that childhood insecurity leads to losing weight or not eating for a full day, for example. However, there are strong results indicating that adults with children report relying on low-cost food to get by as well as having difficulty affording balanced meals. Again, there is no evidence that children are experiencing severe hardships related to the food security status in the prior generation. If long-run food insecurity is partially determined by learned behaviors in childhood, especially in adolescence, then it is reasonable that the effects show up in terms of stressful perceptions and food resource management behavior; however, this is speculative as we are not able to test this mechanism directly.

[Figure 5 here]

There may be other outcomes that help us understand candidate pathways for intergenerational transmission of food insecurity. One mechanism that could explain an

[22] Any childhood marginal, low, or very low food security implies an increase of 1.239 in the adult raw food security score after adjusting for life-cycle bias, compared to 1.934 in Table 2. The corresponding conditional correlations are 0.798 adjusted, as in Table D1, and 0.772 unadjusted, as in Table 1.
[23] For evidence on the associations between individual questionnaire responses in childhood and early adult outcomes, see Table E1 in the appendix.

independent role for childhood insecurity leading to adult insecurity would be the adverse effects of insufficient nutrition. While food insecurity measures do not provide direct measures of nutritional intake or child hunger, children in food-insecure homes are more likely to experience such hardships that in turn could hinder developmental progress or attention span in school. Thus, childhood food security could directly influence adult earnings ability through human capital development channels. Adults may have also learned to cope with limited income by trading off food spending for covering other bills. Since health status and educational attainment are also both candidate consequences and determinants of food insecurity (see Gundersen and Ziliak 2015; 2018; Jyoti, Frongillo, and Jones 2005), we also consider adult outcomes for self-reporting very good or excellent health as well as whether the individual has attended any college. Lastly, SNAP receipt improves food security (see Heflin and Ziliak 2024), so we examine whether childhood food insecurity is related to SNAP use in adulthood. In Table 3, we explore potential mechanism outcomes with conditional OLS estimates across various measures of childhood insecurity, and we show 2SLS estimates for any childhood marginal, low, or very low food security.

[Table 3 here]

Conditional correlations imply negative impacts on the percentile rank of earnings-to-needs, the log real wage rate, and the percentile rank of food spending-to-need in adulthood when exposed to childhood low or very low food security. However, there is no IV evidence of an earnings-to-needs or food budget effect despite suggestive evidence that childhood food insecurity could harm future wages (p-value = 0.081) despite a smaller sample with nonmissing wages. We do not find an effect on early adult health, though self-reported health at these ages of early adulthood may not pick up underlying health issues that arise later. We do see a large and statistically significant (p-value = 0.019) decrease in college attendance given childhood food insecurity, and education can be an important factor for food security in terms of resource management and knowledge about healthful diets, as well as possible benefits from social capital and healthful peer effects. Lastly, the IV estimates suggest that childhood food insecurity leads to lower take-up of SNAP in early adulthood by about 23 percentage points (p-value = 0.088).

In summary, intergenerational patterns of food insecurity are associated with lower wages in early adulthood, despite imprecise estimates, and childhood insecurity is predictive of lower college attendance and lower SNAP take-up. Therefore, it is plausible that childhood food insecurity limits human capital development and engaging in practices that are protective of food security in adulthood. The long-run effects on specific food security module items reveals stronger effects on worrying about food and relying on low-cost food for children in the household, which may be related to learned food management behavior.

VI. DISCUSSION

Intergenerational correlations in food insecurity are around 0.1 to 0.2 among young adults aged 18 to 34, where greater severity of childhood exposure implies worse outcomes in adulthood. The effects across generations extend beyond income and unobserved family fixed effects. IV estimates that account for time-varying endogeneity and underreporting — based on childhood policy variation (1996–2002) in SNAP and TANF benefit generosity as well as SNAP policy index variables for noncitizen eligibility, online application access, and shorter recertification periods — imply larger causal effects of exposure to food insecurity. These are the first point estimates of persistent food insecurity effects across generations, and therefore an important benchmark for studies of intergenerational persistence of poverty and deprivation. The intensity of childhood insecurity as well as the timing of exposure both matter for long-run implications, where stronger effects are seen for greater severity of insecurity and when observed at older ages. The possibility that intergenerational food insecurity is related to learning mechanisms is suggested by the types of affirmative responses most influenced during adulthood. Those exposed to childhood food insecurity are more likely to indicate worrying about food, perceiving that food does not last, and, when children are present, relying on low-cost foods as well as not affording balanced meals. In terms of related outcomes in early adulthood, experiencing childhood food insecurity decreases college attendance and reduces SNAP take-up.

Causal estimates indicate that childhood food security status is an important determinant for food insecurity as an adult. While the harms of food insecurity for children are well known in terms of health or behavioral problems (Gundersen and Ziliak 2014), this analysis implies that the persistence of food insecurity across generations may stem in part from learned coping behaviors. While this evidence does not strictly test for a learning mechanism in intergenerational food insecurity, Wolfson, Insolera, and Cohen (2020) show that children who participate in food preparation and have a parent knowledgeable about nutrition are less likely to be food insecure as adults. This evidence is complementary with a literature on the effectiveness of SNAP education for food security (Keller et al. 2024). Hoynes, Schanzenbach, and Almond (2016) and Bailey et al. (2024) provide strong evidence of the long-run successes of food assistance policy; however, states have some administrative policy choice over the degree to which such programs are expanded or supported. In the early 2000s, many states invested in program outreach while easing eligibility, though some also implemented measures that might deter participation, such as shorter recertification periods or statewide fingerprinting requirements (Ziliak 2015). Our findings on SNAP take-up given childhood food insecurity suggest that future policy decisions consider a longer-term view on addressing food hardship.

We document an important long-run outcome of food hardship as a fundamental measure of family well-being, which contributes to a literature addressing socioeconomic persistence across generations. Prior intergenerational research emphasized the total correlations across parent-child generations (Solon 1999), which provide an indicator of how much family background continues to matter in the long run. Such broad measures of persistence are noteworthy for their ease in interpretation and comparison across place, time, or outcomes of interest. Our estimates are similar in magnitude compared to an important related outcome, self-reported health (Halliday, Mazumder, and Wong 2021), and perhaps around half as large as U.S. estimates of intergenerational elasticities in earnings (Solon 1999). Black and Deveraux (2011) note a shift in intergenerational research toward answering the question of why family background matters, or specifically, what causal approaches add to our understanding of long-run family dynamics and the potential role of policy intervention. In particular, Black and Deveraux mention the conceptual preferability of the IV approach for exogenously identifying family effects that might be most responsive to policy reform. Persistence in food insecurity complements our understanding of long-run family processes both in terms of examining a specific example for how certain forms of socioeconomic disadvantage persist as well as highlighting important aspects of how these intergenerational effects are identified through state variation in food and cash assistance policy. In relation to Gundersen's (2013) summary of food security as a serious national concern, our estimates provide more context on key areas including the determinants of food insecurity, far-reaching consequences across the lifespan, and support for possible directions of future research related to the role of financial management skills.

References

Almada, L., I. McCarthy, and R. Tchernis. 2016. "What can we learn about the effects of Food Stamps on obesity in the presence of misreporting?" *American Journal of Agricultural Economics*, 98 (4): 997–1017.

Almond, D., and J. Currie. 2011. "Killing me softly: The fetal origins hypothesis." *Journal of Economic Perspectives*, 25 (3): 153–172.

Andrews, I., J.H. Stock, and L. Sun. 2019. "Weak instruments in instrumental variables regression: Theory and practice." *Annual Review of Economics*, 11: 727–753.

Angrist, J.D., and J.-S. Pischke. 2008. *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton, NJ: Princeton University Press.

Arteaga, I., and P.E. Wilde. 2023. "Measuring food security in the United States for more than 25 years: history, methods, findings, and opportunities." *Journal of the Academy of Nutrition and Dietetics*, 123 (10): S5–S19.

Bailey, M.J., H. Hoynes, M. Rossin-Slater, and R. Walker. 2024. "Is the social safety net a long-term investment? Large-scale evidence from the Food Stamps Program." *Review of Economic Studies*, 91 (3): 1291–1330.

Basu, S., C. Wimer, and H. Seligman. 2016. "Moderation of the relation of county-level cost of living to nutrition by the Supplemental Nutrition Assistance Program." *American Journal of Public Health*, 106 (11): 2064–2070.

Becker, G.S. and N. Tomes. 1979. "An equilibrium theory of the distribution of income and intergenerational mobility." *Journal of Political Economy*, 87 (6): 1153–1189.

Becker, G.S. and N. Tomes. 1986. “Human capital and the rise and fall of families.” *Journal of Labor Economics*, 4 (3): S1–S39.

Bhattacharya, D. and B. Mazumder. 2008. “A nonparametric analysis of black-white differences in intergenerational income mobility in the United States.” *Quantitative Economics*, 2 (3): 335–379.

Björklund, A., and M. Jäntti. 2020. “Intergenerational mobility, intergenerational effects, sibling correlations, and equality of opportunity: A comparison of four approaches.” *Research in Social Stratification and Mobility*, 70: 100455.

Black, S.E. and P.J. Devereaux. 2011. “Recent developments in intergenerational mobility.” In *Handbook of Labor Economics*, vol. 4B, O. Ashenfelter and D. Card (eds.), Amsterdam: North Holland, 1487–1541.

Black, S.E., P.J. Devereaux, and K.G. Salvanes. 2007. “From the cradle to the labor market? The effect of birth weight on adult outcomes.” *Quarterly Journal of Economics*, 122 (1): 409–439.

Bollinger, C., and M. David. 1997. “Modeling discrete choice with response error: Food Stamp participation.” *Journal of the American Statistical Association*, 92 (439): 827–835.

Bollinger, C., and M. David. 2005. “I didn’t tell, and I won’t tell: Dynamic response error in the SIPP.” *Journal of Applied Econometrics*, 20 (4): 563–569.

Bronchetti, E.T., G.S. Christensen, and H.H. Hoynes. 2019. “Local food prices, SNAP purchasing power, and child health.” *Journal of Health Economics*, 68 (1): 1–17.

Brown, C. 1996. “Notes on the ‘SEO’ or ‘Census’ component of the PSID.” Report, Survey Research Center, Institute for Social Research, University of Michigan, Ann Arbor, MI.

Carneiro, P., C. Meghir, and M. Parey. 2013. "Maternal education, home environments and the development of children and adolescents." *Journal of the European Economic Association*, 11 (S1): 123–160.

Charles, K.K., S. Danziger, G. Li, and R. Schoeni. 2014. "The intergenerational correlation of consumption expenditures." *American Economic Review: Papers and Proceedings*, 104 (5): 136–140.

Charles, K.K. and E. Hurst. 2003. "The correlation of wealth across generations." *Journal of Political Economy*, 111 (6): 1155–1182.

Chetty, R., D. Grusky, M. Hell, N. Hendren, R. Manduca, and J. Narang. 2017. "The fading American dream: Trends in absolute income mobility since 1940." *Science*, 356 (6336): 398–406.

Chetty, R., N. Hendren, P. Kline, and E. Saez. 2014a. "Where is the land of opportunity? The geography of intergenerational mobility in the United States." *Quarterly Journal of Economics*, 129 (4): 1553–1623.

Chetty, R., N. Hendren, P. Kline, E. Saez, and N. Turner. 2014b. "Is the United States still a land of opportunity?" *American Economics Review: Papers and Proceedings*, 104 (5): 141–147.

Coleman-Jensen, A., M.P. Rabbitt, C.A. Gregory, and A. Singh. 2021. "Household food security in the United States in 2020." Economic Research Report 298, U.S. Department of Agriculture, Economic Research Service.

Cruz, L.M., and M.J. Moreira. 2005. "On the validity of econometric techniques with weak instruments: Inference on returns to education using compulsory school attendance laws." *Journal of Human Resources*, XL (2): 393–410.

Currie, J. and E. Moretti. 2007. "Biology as destiny? Short and long-run determinants of intergenerational transmission of birth weight." *Journal of Labor Economics*, 25 (2): 231–264.

Dhongde, S. and R. Haveman. 2017. "Multi-dimensional deprivation in the U.S." *Social Indicators Research*, 133 (2): 477–500.

Drèze, J. and A. Sen. 1989. *Hunger and Public Action*. Oxford, UK: Clarendon Press.

Duncan, G.J., W.J. Yeung, J. Brooks-Gunn, and J.R. Smith. 1998. "How much does childhood poverty affect the life chances of children." *American Sociological Review*, 63 (3): 406–423.

Elango, S., J.L. García, J.J. Heckman, and A. Hojman. 2016. "Early childhood education." In *Economics of Means-Tested Transfer Programs in the United States*, vol. II, R.A. Moffitt (ed.), University of Chicago Press, 235–298.

Fox, L.E. 2015. "Parental wealth and the black-white mobility gap in the U.S." *Review of Income and Wealth*, 62 (4): 706–723.

Fox, L.E. 2020. "The Supplemental Poverty Measure: 2019." Current Population Reports, P60-272, U.S. Census Bureau.

Fox, L.E., C. Wimer, I. Garfinkel, N. Kaushal, and J. Waldfogel. 2015. "Waging war on poverty: Poverty trends using a historical supplemental poverty measure." *Journal of Policy Analysis and Management*, 34 (3): 567–592.

Frongillo, E.A., H.T. Nguyen, M.D. Smith, and A. Coleman-Jensen. 2017. “Food insecurity is associated with subjective well-being among individuals from 138 countries in the 2014 Gallup World Poll.” *Journal of Nutrition*, 147 (4): 680–687.

Gelbach, J. 2016. “When do covariates matter? And which ones, and how much?” *Journal of Labor Economics*, 34 (2): 509–543.

Grawe, N. 2006. “Lifecycle bias in estimates of intergenerational earnings persistence.” *Labour Economics*, 13 (5): 551–570.

Gregory, C.A. 2020. “Partial identification with a Bayesian 4-parameter IRT model.” *Journal of Classification*, 37: 632–655.

Gregory, C., M.P. Rabbitt, and D.C. Ribar. 2015. “The Supplemental Nutrition Assistance Program and food insecurity.” In *SNAP Matters: How Food Stamps Affect Health and Well Being*. J. Bartfeld, C. Gundersen, T. Smeeding, and J. Ziliak (eds.), Redwood City, CA: Stanford University Press, 74–106.

Gundersen, C. 2013. “Food Insecurity Is an Ongoing National Concern.” *Advances in Nutrition*, 4 (1): 36–41.

Gundersen, C., E. Engelhard, and M. Hake. 2017. “The determinants of food insecurity among food bank clients in the United States.” *Journal of Consumer Affairs*, 51 (3): 501–518.

Gundersen, C.G., and S.B. Garasky. 2012. “Financial management skills are associated with food insecurity in a sample of households with children in the United States.” *Journal of Nutrition*, 142 (10): 1865–1870.

Gundersen, C., B. Kreider, and J.V. Pepper. 2011. “The economics of food insecurity in the United States.” *Applied Economic Perspectives and Policy*, 33 (3): 281–303.

Gundersen, C., B. Kreider, and J.V. Pepper. 2018. "The intergenerational transmission of food insecurity: A non-parametric bounds analysis." Discussion paper series, DP2019-07, University of Kentucky Center for Poverty Research.

Gundersen, C., and D. Ribar. 2011. "Food insecurity and insufficiency at low levels of food expenditures." *Review of Income and Wealth*, 57 (4): 704–726.

Gundersen, C., and J.P. Ziliak. 2014. "Childhood food insecurity in the U.S.: Trends, causes, and policy options." Research report, *Future of Children*, Princeton-Brookings, Fall 2014.

Gundersen, C., and J.P. Ziliak. 2015. "Food insecurity and health outcomes." *Health Affairs*, 34 (11): 1830–1839.

Gundersen, C., and J.P. Ziliak. 2018. "Food insecurity research in the United States: Where we have been and where we need to go." *Applied Economic Perspectives and Policy*, 40 (1): 119–135.

Haider, S.J. and G. Solon. 2006. "Life-cycle variation in the association between current and lifetime earnings." *American Economic Review*, 96 (4): 1308–1320.

Halliday, T., B. Mazumder, and A. Wong. 2021. "Intergenerational mobility in self-reported health status in the US." *Journal of Public Economics*, 193: 104307.

Hamersma, S., and M. Kim. 2025. "The intergenerational transmission of food insecurity: Do educational compromises make things worse?" *Southern Economic Journal*, forthcoming.

Hartley, R.P., C. Lamarche, and J.P. Ziliak. 2022. "Welfare reform and the intergenerational transmission of dependence." *Journal of Political Economy*, 130 (3): 523–565.

Hartley, R.P., L. Toppenberg, and S. Dhongde. 2024. "Poverty and disadvantage throughout childhood in the United States." *Child Indicators Research*, 17: 2709–2737.

Hausman, J.A., J. Abrevaya, and F. Scott-Morton. 1998. “Misclassification of the dependent variable in a discrete-response setting.” *Journal of Econometrics*, 87 (2): 239–269.

Heckman, J.J. and S. Mosso. 2014. “The economics of human development and social mobility.” *Annual Review of Economics*, 6 (1): 689–733.

Heflin, C., and J.P. Ziliak. 2024. “Does the reference period matter when evaluating the effect of SNAP on food insecurity?” *Applied Economic Perspectives and Policy*, 46 (4): 1268–1285.

Hoynes, H., D. Schanzenbach, and D. Almond. 2016. “Long-run impacts of childhood access to the safety net.” *American Economic Review*, 106 (4): 903–934.

Jones, J.W., C. Courtemanche, A. Denteh, J. Marton, and R. Tchernis. 2022. “Do state Supplemental Nutrition Assistance Program policies influence program participation among seniors?” *Applied Economic Perspectives and Policy*, 44 (2): 591–608.

Jyoti, D.F., E.A. Frongillo, and S.J. Jones. 2005. “Food insecurity affects school children’s academic performance, weight gain, and social skills.” *Journal of Nutrition*, 135 (12): 2831–2839.

Keane, M., and T. Neal. 2023. “Instrument strength in IV estimation and inference: A guide to theory and practice.” *Journal of Econometrics*, 235 (2): 1625–1653.

Keller, K.J.M., P. Bruno, S. Foerster, and C. Draper. 2024. “Thirty years of SNAP-Ed: The transition of the nation’s largest nutrition education program into a pillar of the public health infrastructure.” *Journal of Nutrition Education and Behavior*, 56 (8): 588–596.

Kleibergen, F. 2005. “Testing parameters in GMM without assuming that they are identified.” *Econometrica*, 73 (4): 1103–1123.

Kleibergen, F., and R. Paap. 2006. "Generalized reduced rank tests using the singular value decomposition." *Journal of Econometrics*, 133 (1): 97–126.

Lee, C. and G. Solon. 2009. "Trends in intergenerational income mobility." *Review of Economics and Statistics*, 91 (4): 766–772.

Lindbeck, A., S. Nyberg, and J.W. Weibull. 1999. "Social norms and economic incentives in the welfare state." *Quarterly Journal of Economics*, 114 (1): 1–35.

Magnuson, K. 2007. "Maternal education and children's academic achievement during middle childhood." *Developmental Psychology*, 43 (6): 1497–1512.

Martin, K.S., B.L. Rogers, J.T. Cook, and H.M. Joseph. 2004. "Social capital is associated with decreased risk of hunger." *Social Science and Medicine*, 58 (12): 2645–2654.

McDonough, I.K., and D.L. Millimet. 2024. "Food security dynamics and measurement error." *American Journal of Agricultural Economics*, 106 (5): 1714–1744.

McKernan, S.M., C. Ratcliffe, and B. Braga. 2021. "The effect of the US safety net on material hardship over two decades." *Journal of Public Economics*, 197 (May): 104403.

Montiel Olea, J.L., and C. Pflueger. 2013. "A robust test for weak instruments." *Journal of Business and Economic Statistics*, 31 (3): 358–369.

Moreira, M.J. 2003. "A conditional likelihood ratio test for structural models." *Econometrica*, 71 (4): 1027–1048.

Moreira, H., and M.J. Moreira. 2019. "Optimal two-sided tests for instrumental variables regression with heteroskedastic and autocorrelated errors." *Journal of Econometrics*, 213 (2): 398–433.

Nolan, L., I. Garfinkel, N. Kaushal, J. Nam, J. Waldfogel, and C. Wimer. 2016. "Trends in child poverty by race/ethnicity: New evidence using an anchored historical supplemental poverty measure." *Journal of Applied Research on Children*, 7 (1): Article 3 [1–22].

Nord, M., M. Andrews, and J. Winicki. 2002. "Frequency and duration of food insecurity and hunger in US households." *Journal of Nutrition Education and Behavior*, 34 (4): 194–201.

Oreopoulos, P., M.E. Page, and A.H. Stevens. 2006. "The intergenerational effects of compulsory schooling." *Journal of Labor Economics*, 24 (4): 729–760.

Page, M.E. 2006. "Fathers' education and children's human capital: Evidence from the WWII G.I. Bill." Working paper 06-33.

Panel Study of Income Dynamics. 2023. Public use dataset. Survey Research Center, Institute for Social Research, University of Michigan, Ann Arbor, MI.

Piketty, T., E. Saez, and G. Zucman. 2018. "Distributional national accounts: Methods and estimates for the United States." *Quarterly Journal of Economics*, 133 (2): 553–609.

Popkin, S.J., M.M. Scott, and M. Galvez. 2016. "Impossible choices: Teens and food insecurity in America." Research report, Urban Institute and Feeding America, September.

Rabbitt, M.P. 2013. "Measuring the effect of Supplemental Nutrition Assistance Program participation on food insecurity using a behavioral Rasch selection model." UNCG Economics working papers 13-20.

Rabbitt, M.P. 2018. "Causal inference with latent variables from the Rasch model as outcomes." *Measurement*, 120 (2018): 193–205.

Rasch, G. 1960. Probabilistic Models for Some Intelligence and Attainment Tests. Copenhagen, Denmark: Danish Institute for Educational Research.

Ratcliffe, C. 2015. “Child poverty and adult success.” Low-Income Working Families Initiative, Urban Institute, Washington, DC.

Ratcliffe, C., S.-M. McKernan, and S. Zhang. 2011. “How much does the Supplemental Nutrition Assistance Program reduce food insecurity?” *American Journal of Agricultural Economics*, 93 (4): 1082–1098.

Scholz, J.K. and K. Levine. 2004. “Wealth inequality and the wealth of cohorts.” In *Social Inequality*, K. Neckerman (ed.), New York, NY: Russell Sage Foundation, 895–929.

Solon, G. 1992. “Intergenerational income mobility in the United States.” *American Economic Review*, 82 (3): 393–408.

Solon, G. 1999. “Intergenerational mobility in the labor market.” In *Handbook of Labor Economics*, vol. 3A, O. Ashenfelter and D. Card (eds.), Amsterdam: North Holland, 1761–1800.

Solon, G., S.J. Haider, and J.M. Wooldridge. 2015. “What are we weighting for?” *Journal of Human Resources*, 50 (2): 301–316.

Stacy, B., L. Tiehen, and D. Marquardt. 2018. “Using a policy index to capture trends and differences in state administration of USDA’s Supplemental Nutrition Assistance Program.” ERR-244, U.S. Department of Agriculture, Economic Research Service, February.

Tiehen, L., C. Vaughn, and J.P. Ziliak. 2020. “Food insecurity in the PSID: A comparison with the levels, trends, and determinants in the CPS 1999–2017.” *Journal of Economic and Social Measurement*, 45 (2): 103–138.

Waldkirch, A., S. Ng, and D. Cox. 2004. "Intergenerational linkages in consumption behavior." *Journal of Human Resources*, 39 (2): 355–381.

Wight, V., N. Kaushal, J. Waldfogel, and I. Garfinkel. 2014. "Understanding the link between poverty and food insecurity among children: Does the definition of poverty matter?" *Journal of Children and Poverty*, 20 (1): 1–20.

Winicki, J., and K. Jemison. 2003. "Food insecurity and hunger in the kindergarten classroom: Its effect on learning and growth." *Contemporary Economic Policy*, 21 (2): 145–157.

Wolfe, B.L., R. Haveman, D. Ginther, and C.B. An. 1996. "The 'window problem' in studies of children's attainments: A methodological exploration." *Journal of the American Statistical Association*, 91 (435): 970–982.

Wolff, E.N. 2002. "Inheritances and wealth inequality, 1989–1998." *American Economic Review: Papers and Proceedings*, 92 (2): 260–264.

Wolfson, J.A., N. Insolera, and A.J. Cohen. 2020. "Childhood food involvement: Protection against food insecurity in young adulthood." *American Journal of Preventative Medicine*, 58 (1): 31–40.

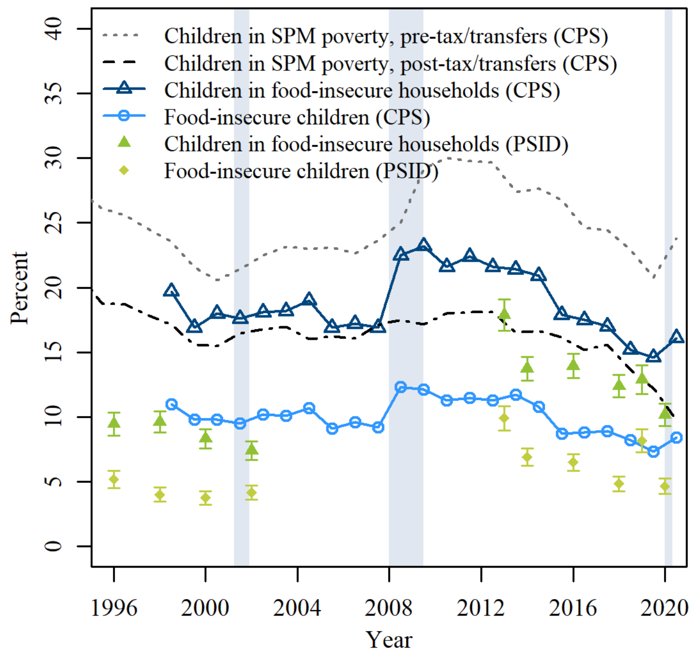
Yen, S.T., M. Andrews, Z. Chen, and D.B. Eastwood. 2008. "Food Stamp Program participation and food insecurity: An instrumental variables approach." *American Journal of Agricultural Economics*, 90 (1): 117–132.

Ziliak, J.P. 2015. "Why are so many Americans on Food Stamps? The role of the economy, policy, and demographics." In *SNAP Matters: How Food Stamps Affect Health and Well Being*. J. Bartfeld, C. Gundersen, T. Smeeding, and J. Ziliak (eds.), Redwood City, CA: Stanford University Press, 18–48.

Ziliak, J.P. and C. Gundersen. 2016. “An overview of SNAP, food security, and geographic factors in food purchase and acquisition decisions.” Discussion paper series, DP2016-02, University of Kentucky Center for Poverty Research.

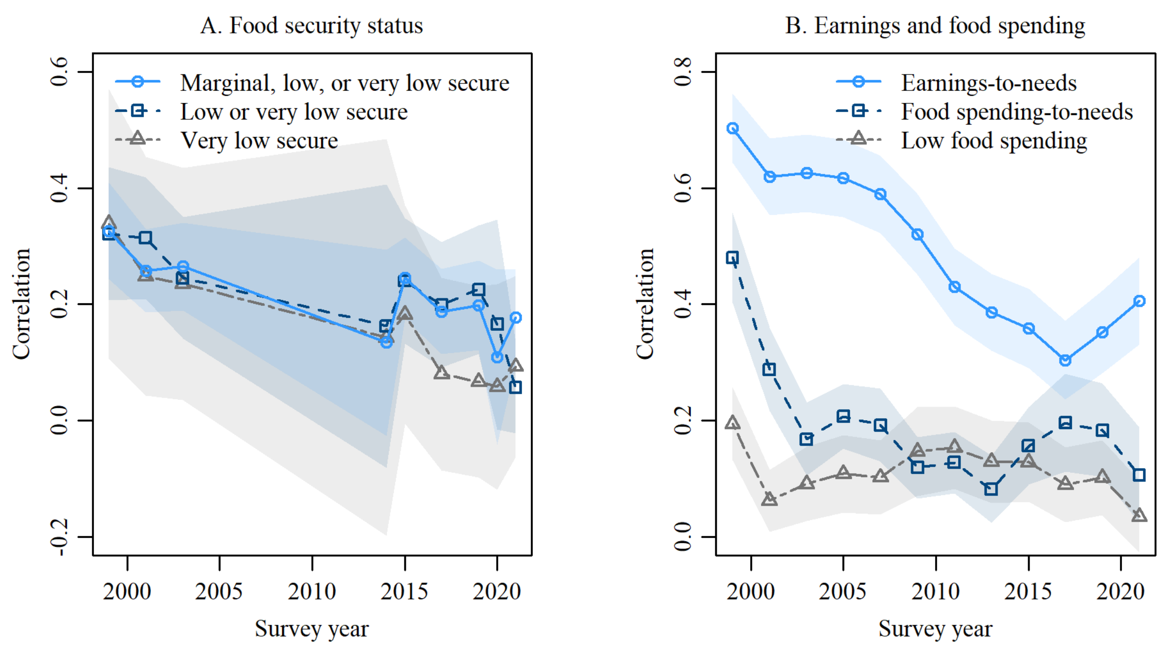
Ziol-Guest, K.M., G.J. Duncan, A. Kalil, and W.T. Boyce. 2012. “Early childhood poverty, immune-mediated disease processes, and adult productivity.” *Proceedings of the National Academy of Sciences*, 109 (S2): 17289–17293.

Figure 1. Percent of Children by Food Security and Poverty Status



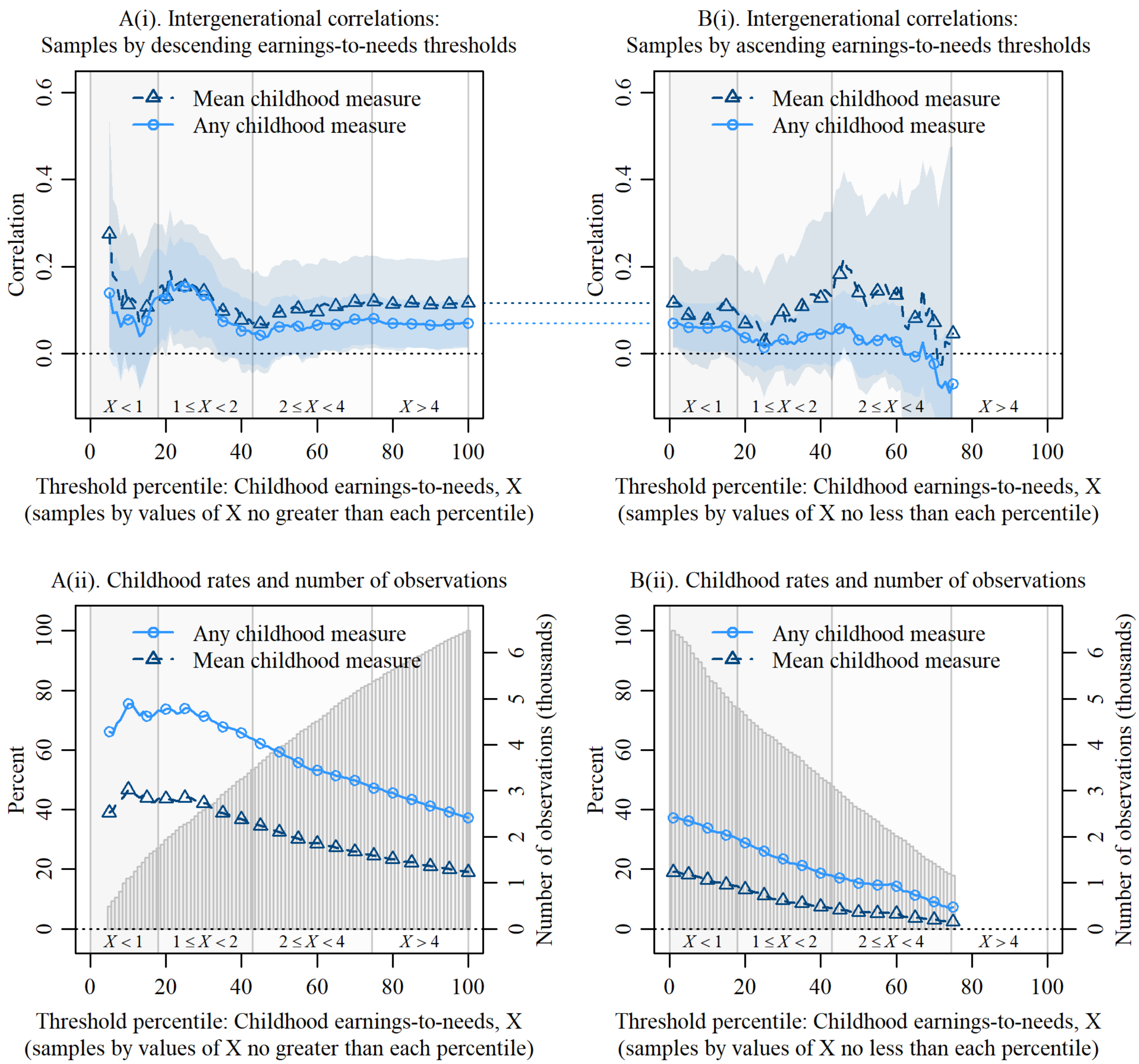
Note: Shaded regions indicate recessions according to the National Bureau of Economic Research.

Figure 2. Within-Family Persistence in Food Security Status, Earnings, and Food Spending Relative to the 1997 Survey Year



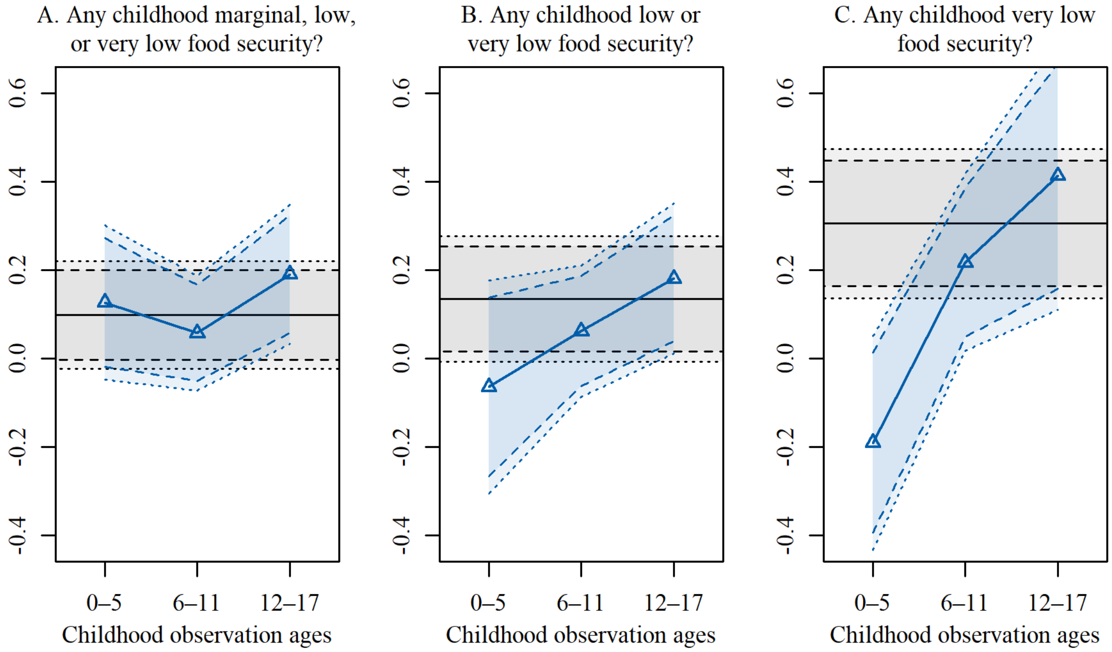
Note: Conditional estimates, using PSID core longitudinal sample weights, are shown with 95-percent pointwise confidence intervals with family-level clustering. Earnings-to-needs is the inverse hyperbolic sine of the ratio of earnings relative to the federal poverty line, food spending denotes total food expenditure and SNAP benefits relative to the USDA Thrifty Food Plan adjusted for state price differences, and low food spending is an indicator for the food spending-to-needs ratio being less than one. For panel B, the initial period represents a three-year average for individuals observed as children during the survey years 1995, 1996, and 1997.

Figure 3. Intergenerational Correlations of Marginal, Low, or Very Low Food Security,
by Samples for Varying Earnings-to-Needs Status Thresholds in Childhood



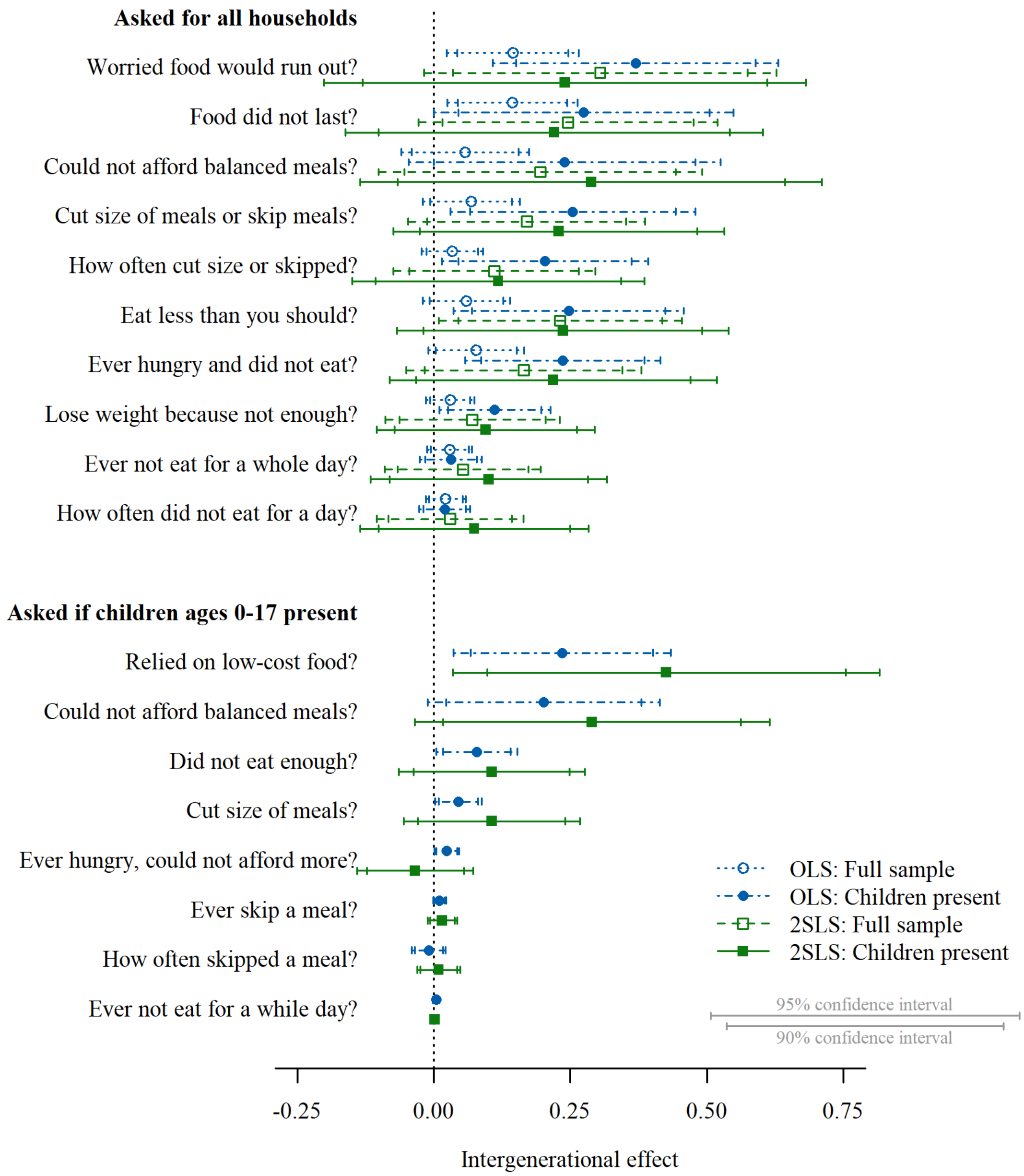
Note: The food security measure in both generations is defined by marginal, low, or very low food security. PSID core longitudinal weights are used in estimation. In panels A(i) and B(i), 95-percent confidence intervals are shown based on family-level clustering. Estimates control for quadratics in age profiles, demographics, family earnings below the federal poverty line during childhood, family wealth and equity during childhood, state-level policy and macroeconomic covariates, and state and year fixed effects. Family fixed effects are omitted in this exercise. In panels A(ii) and B(ii), the lines showing rates of childhood exposure correspond to the left axis and the bars indicating the number of observations to the right axis. The rightmost samples in the A panels and the leftmost samples in the B panels are equivalent and correspond to the full estimation sample.

Figure 4. Intergenerational Correlations in Early Adult Marginal, Low, or Very Low Food Insecurity by Childhood Measurement Timing and Severity of Insecurity



Note: The main childhood estimates across all ages 0 to 17 are shown by the constant series, and the other estimates depend only on observations within the given childhood age ranges. Estimates control for quadratics in age profiles, demographics, family earnings below the federal poverty line during childhood, family wealth and equity during childhood, family fixed effects common to siblings and cousins, state-level policy and macroeconomic covariates, and state and year fixed effects. PSID core longitudinal weights are used in estimation. The shaded regions show 90- and 95- percent confidence intervals based on family-level clustering.

Figure 5. Conditional Correlations and 2SLS Estimates of Childhood Marginal, Low, or Very Low Food Security Effects on Food Security Module Questionnaire Responses



Note: Estimates control for quadratics in age profiles, demographics, family earnings below the federal poverty line during childhood, family wealth and equity during childhood, state-level policy and macroeconomic covariates, year fixed effects, and, for correlations only, family fixed effects common to siblings and cousins and state fixed effects. The instruments include real SNAP benefit standards, real TANF benefit standards, whether noncitizen adults are fully eligible for SNAP, whether SNAP applications are accepted online, and the proportion of SNAP units with a 1–3 month recertification period. PSID core longitudinal weights are used in estimation. The lines show 90- and 95- percent confidence intervals based on family-level clustering.

Table 1. Intergenerational Correlations of Food Security Status

Early adulthood outcome:	Food security raw score		Marginal, low, or very low food secure?		Low or very low food secure?		Very low food secure?	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Conditional:	No	Yes	No	Yes	No	Yes	No	Yes
Childhood measure:	A. Full sample: Adults with or without children (n = 1701, N = 6476)							
Any marginal, low, or very low food secure?	1.096	0.772	0.201	0.099	0.146	0.111	0.071	0.041
	(0.182)	(0.407)	(0.025)	(0.062)	(0.023)	(0.063)	(0.017)	(0.029)
Any low or very low food secure?	1.185	0.798	0.207	0.135	0.145	0.133	0.083	0.034
	(0.262)	(0.495)	(0.034)	(0.072)	(0.032)	(0.076)	(0.025)	(0.042)
Any very low food secure?	1.530	1.750	0.279	0.306	0.215	0.299	0.097	0.097
	(0.354)	(0.646)	(0.042)	(0.086)	(0.050)	(0.102)	(0.029)	(0.054)
Any child food insecure?	1.180	0.334	0.210	0.115	0.147	0.078	0.076	-0.037
	(0.271)	(0.617)	(0.035)	(0.078)	(0.038)	(0.089)	(0.026)	(0.059)
Childhood measure:	B. Subsample: Adults with children present (n = 916, N = 3376)							
Any marginal, low, or very low food secure?	1.058	2.572	0.179	0.303	0.143	0.318	0.055	0.165
	(0.232)	(1.079)	(0.035)	(0.127)	(0.030)	(0.142)	(0.018)	(0.084)
Any low or very low food secure?	1.175	2.984	0.185	0.406	0.143	0.419	0.063	0.168
	(0.320)	(0.859)	(0.045)	(0.106)	(0.041)	(0.120)	(0.024)	(0.060)
Any very low food secure?	1.919	3.626	0.317	0.477	0.263	0.543	0.104	0.204
	(0.576)	(1.243)	(0.067)	(0.157)	(0.078)	(0.170)	(0.040)	(0.082)
Any child food insecure?	1.333	2.014	0.201	0.378	0.167	0.310	0.073	0.067
	(0.383)	(1.118)	(0.054)	(0.136)	(0.052)	(0.154)	(0.026)	(0.077)

Note: Robust standard errors with family-level clustering are shown in parentheses, and PSID core longitudinal weights are used in estimation. Conditional estimates control for quadratics in age profiles, demographics, family earnings below the federal poverty line during childhood, family wealth and equity during childhood, family fixed effects common to siblings and cousins, state-level policy and macroeconomic covariates, and state and year fixed effects.

Table 2. 2SLS Estimates of Childhood Marginal, Low, or Very Low Food Security
Effects on Early Adulthood Food Security Status

Early adulthood outcome:	Food security raw score	Marginal, low, or very low food secure?	Low or very low food secure?	Very low food secure?
	(1)	(2)	(3)	(4)
Childhood measure:	A. Full sample: Adults with or without children (n = 1701, N = 6476)			
Any marginal, low, or very low food secure?	1.934	0.369	0.237	0.133
	(1.099)	(0.177)	(0.144)	(0.097)
Weak IV F stat. (robust)	16.791	16.791	16.791	16.791
Effective F stat. (cluster)	2.995	2.995	2.995	2.995
Cluster-robust $\hat{\beta}$ p-value	[0.013]	[0.054]	[0.112]	[0.052]
Underidentification stat.	14.180	14.180	14.180	14.180
p-value	[0.015]	[0.015]	[0.015]	[0.015]
Hansen J statistic	4.634	4.035	3.918	6.900
p-value	[0.327]	[0.401]	[0.417]	[0.141]
Childhood measure:	B. Subsample: Adults with children present (n = 916, N = 3376)			
Any marginal, low, or very low food secure?	2.735	0.330	0.364	0.168
	(1.781)	(0.247)	(0.219)	(0.135)
Weak IV F stat. (robust)	7.922	7.922	7.922	7.922
Effective F stat. (cluster)	1.683	1.683	1.683	1.683
Cluster-robust $\hat{\beta}$ p-value	[0.056]	[0.157]	[0.074]	[0.112]
Underidentification stat.	8.002	8.002	8.002	8.002
p-value	[0.156]	[0.156]	[0.156]	[0.156]
Hansen J statistic	5.339	3.188	5.463	7.005
p-value	[0.254]	[0.527]	[0.243]	[0.136]

Note: Robust standard errors with family-level clustering are shown in parentheses, and PSID core longitudinal weights are used in estimation. Estimates control for quadratics in age profiles, demographics, family earnings below the federal poverty line during childhood, family wealth and equity during childhood, state-level policy and macroeconomic covariates, and year fixed effects. The instruments include real SNAP benefit standards, real TANF benefit standards, whether noncitizen adults are fully eligible for SNAP, whether SNAP applications are accepted online, and the proportion of SNAP units with a 1–3 month recertification period. The IV statistics shown include a heteroskedasticity-robust weak-IV F statistic, the Montiel Olea and Pflueger (2013) cluster-robust effective F statistic, a cluster-robust K statistic p-value for $H_0: \beta = 0$, the Kleibergen and Paap (2006) underidentification rank statistic, and the Hansen J statistic for valid instruments given overidentifying restrictions.

Table 3. Intergenerational Conditional Correlations and 2SLS Estimates for Childhood Food Security Status and Early Adulthood Outcomes Potentially Related to Adult Food Insecurity

Early adulthood outcome:	Earnings pctile rank (1)	Log real wage rate (2)	Food expend. pctile rank (3)	Very good health? (4)	Attend any college? (5)	Receive SNAP? (6)
Childhood measure:	A. Conditional correlations, by childhood food security status					
Mean food security raw score	-0.015	-0.017	-0.019	-0.013	-0.022	0.007
	(0.009)	(0.058)	(0.011)	(0.023)	(0.017)	(0.015)
Any marginal, low, or very low food secure?	-0.034	0.186	-0.052	-0.075	-0.025	0.042
	(0.027)	(0.177)	(0.035)	(0.066)	(0.062)	(0.042)
Any low or very low food secure?	-0.070	-0.215	-0.091	-0.046	-0.036	0.049
	(0.034)	(0.145)	(0.041)	(0.084)	(0.067)	(0.053)
Any very low food secure?	-0.123	-0.373	-0.195	-0.100	-0.062	0.036
	(0.042)	(0.278)	(0.068)	(0.138)	(0.094)	(0.079)
Any child food insecure?	-0.032	-0.031	-0.068	0.070	-0.077	-0.029
	(0.054)	(0.303)	(0.047)	(0.118)	(0.066)	(0.053)
Childhood measure:	B. 2SLS estimated effects of any childhood marginal, low, or very low food security					
Any marginal, low, or very low food secure?	-0.118	-0.839	0.047	-0.133	-0.419	-0.229
	(0.103)	(0.539)	(0.113)	(0.224)	(0.204)	(0.150)
Weak IV F stat. (robust)	15.844	13.190	15.844	13.729	16.791	16.810
Effective F stat. (cluster)	3.093	2.755	3.093	2.912	2.995	3.002
Cluster-robust $\hat{\beta}$ p-value	[0.300]	[0.081]	[0.632]	[0.833]	[0.019]	[0.088]
Underidentification stat.	14.617	13.221	14.617	13.819	14.180	14.210
p-value	[0.012]	[0.021]	[0.012]	[0.017]	[0.015]	[0.014]
Hansen J statistic	2.075	1.465	3.511	10.335	4.007	0.561
p-value	[0.722]	[0.833]	[0.476]	[0.035]	[0.405]	[0.967]
Individuals	1701	1578	1701	1576	1701	1701
Observations	6001	5047	6001	4970	6476	6462

Note: Robust standard errors with family-level clustering are shown in parentheses, and PSID core longitudinal weights are used in estimation. Estimates control for quadratics in age profiles, demographics, family earnings below the federal poverty line during childhood, family wealth and equity during childhood, state-level policy and macroeconomic covariates, year fixed effects, and, for correlations only, family fixed effects common to siblings and cousins and state fixed effects. The instruments include real SNAP benefit standards, real TANF benefit standards, whether noncitizen adults are fully eligible for SNAP, whether SNAP applications are accepted online, and the proportion of SNAP units with a 1–3 month recertification period. The IV statistics shown include a heteroskedasticity-robust weak-IV F statistic, the Montiel Olea and Pflueger (2013) cluster-robust effective F statistic, a cluster-robust K statistic p-value for $H_0: \beta = 0$, the Kleibergen and Paap (2006) underidentification rank statistic, and the Hansen J statistic for valid instruments given overidentifying restrictions.

Online Appendix to

The Persistence of Food Security Status Across Generations[*]

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Appendix A. Food Security Measurement, Severity, and Household Characteristics

A1. Defining Food Insecurity

Food security measures referenced throughout rely on the United States Department of Agriculture (USDA) 18-item questionnaire described in Coleman-Jensen et al. (2021):

Questions 1–3 were asked for the household as a whole, and questions 4–10 for adults in the household

1. "We worried whether our food would run out before we got money to buy more." Was that often, sometimes, or never true for you in the last 12 months?
2. "The food that we bought just didn't last and we didn't have money to get more." Was that often, sometimes, or never true for you in the last 12 months?
3. "We couldn't afford to eat balanced meals." Was that often, sometimes, or never true for you in the last 12 months?
4. In the last 12 months, did you or other adults in the household ever cut the size of your meals or skip meals because there wasn't enough money for food? (Yes/No)
5. (If yes to question 4) How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?
6. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food? (Yes/No)
7. In the last 12 months, were you ever hungry, but didn't eat, because there wasn't enough money for food? (Yes/No)
8. In the last 12 months, did you lose weight because there wasn't enough money for food? (Yes/No)
9. In the last 12 months did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food? (Yes/No)
10. (If yes to question 9) How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?

Questions 11–18 were asked only if the household included children age 0–17

11. "We relied on only a few kinds of low-cost food to feed our children because we were running out of money to buy food." Was that often, sometimes, or never true for you in the last 12 months?
12. "We couldn't feed our children a balanced meal, because we couldn't afford that." Was that often, sometimes, or never true for you in the last 12 months?
13. "The children were not eating enough because we just couldn't afford enough food." Was that often, sometimes, or never true for you in the last 12 months?
14. In the last 12 months, did you ever cut the size of any of the children's meals because there wasn't enough money for food? (Yes/No)
15. In the last 12 months, were the children ever hungry but you just couldn't afford more food? (Yes/No)
16. In the last 12 months, did any of the children ever skip a meal because there wasn't enough money for food? (Yes/No)
17. (If yes to question 16) How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?
18. In the last 12 months did any of the children ever not eat for a whole day because there wasn't enough money for food? (Yes/No)

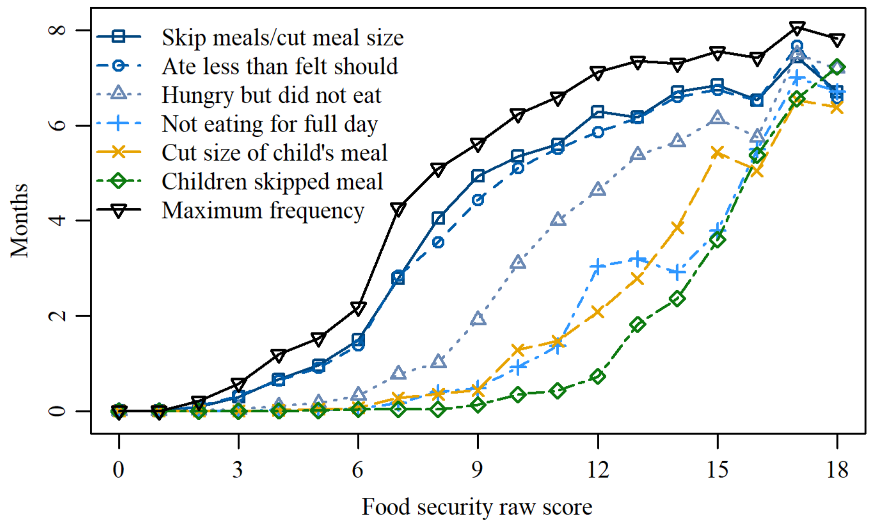
As described by Coleman-Jensen et al. (2021), these questions become coded as affirmative if the responses indicate directly with a "yes" or acknowledging the statement applies at least some amount in the last 12 months beyond the minimum option provided. The affirmative responses are totaled to give a raw score of food insecurity for the household. For households with no children present (based on the first 10 questions only), a raw score of 3 or more is classified as food insecure, which includes those with low food security with a raw score of 3 to 5, and those with very low food security with a raw score greater than 5. For households with children (based on all 18 questions), a raw score of 3 or more is still classified as food insecure, though the range for low food security is 3 to 7 and for very low food security it is a raw score of 8 or more. Further, based only on the child-specific questions (11–18), households affirming 2 or more of these questions are classified as food insecure among children. In this analysis, we also include any affirmative response to the food security module questions as marginal food secure if the raw score is 1 or 2.

The food security raw score and its classifications are summary measures of a household's status over the last 12 months. However, the food security raw score is increasing with measures of frequency for specific questions of food hardship, both over the last year and the last month, as shown in Figure A1 based on the Current Population Survey December Supplement, survey years 1998–2004.

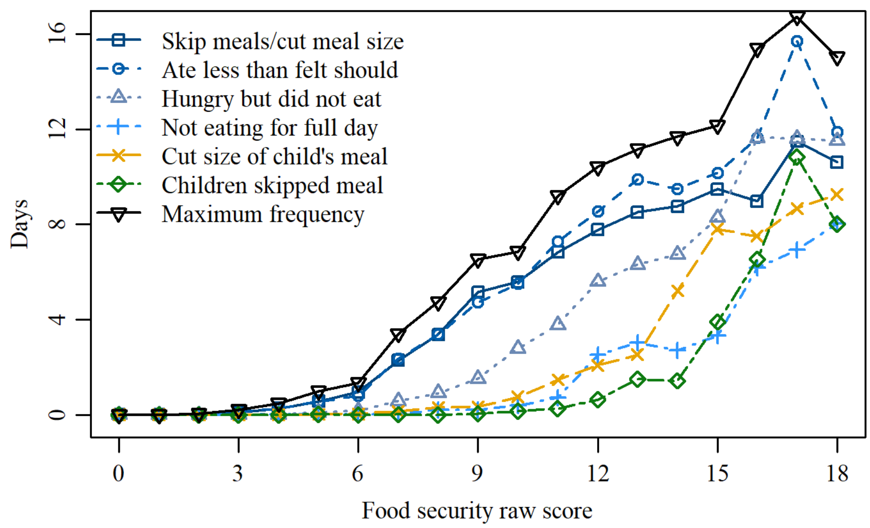
For this analysis, we use the Panel Study of Income Dynamics (PSID) for individuals observed during childhood in survey years 1997–2003, and again in adulthood in survey years 2014–2021. Table A1 provides descriptive statistics for the estimation sample, including food security status as well as other household characteristics like earnings, Supplemental Nutrition Assistance Program (SNAP) receipt, and demographics.

Figure A1. Frequency of Food Hardship relative to the Food Security Raw Score

A. How frequently in the past year?



B. How frequently in the past 30 days?



Note: Authors' calculations from the Current Population Survey December Supplement, survey years 1998 to 2004, among children under the age 18. These years align with the PSID childhood observation window. Individual food supplement sample weights are used in estimation. The maximum frequency shown corresponds to the most frequent reported among the listed hardships.

Table A1. Descriptive Statistics by Generational Life Stage

	Childhood, ages 0–17	Early adulthood, ages 18–34	Early adulthood, children present	Adults aged 18–34 not in sample
Survey years:	1997–2003	2014–2021	2014–2021	2014–2021
Family income (thousands)	71.637	57.889	63.563	52.602
	(75.244)	(63.980)	(66.192)	(66.067)
Family earnings (thousands)	59.756	49.350	53.035	45.250
	(73.556)	(61.109)	(65.088)	(58.900)
Food expenditure (thousands)	9.171	8.291	9.576	8.212
	(5.767)	(6.433)	(6.374)	(6.444)
Food stamps/SNAP value (thousands)	3.767	3.659	4.445	3.788
[conditional on receipt]	(3.086)	(3.566)	(3.337)	(3.447)
Receives food stamps/SNAP?	0.124	0.166	0.265	0.140
	(0.329)	(0.372)	(0.441)	(0.347)
Food spending per Thrifty Food Plan	2.028	2.152	1.736	2.117
	(1.127)	(1.411)	(1.015)	(1.402)
Food spending below Thrifty Food Plan?	0.120	0.156	0.220	0.164
	(0.324)	(0.363)	(0.414)	(0.370)
Food secure?	0.816	0.718	0.691	0.682
	(0.387)	(0.450)	(0.462)	(0.466)
Marginal food secure?	0.085	0.118	0.125	0.142
	(0.279)	(0.322)	(0.330)	(0.350)
Low food secure?	0.073	0.093	0.122	0.119
	(0.261)	(0.290)	(0.327)	(0.324)
Very low food secure?	0.026	0.072	0.063	0.056
	(0.158)	(0.258)	(0.243)	(0.230)
Food-insecure children?	0.049	0.043	0.087	0.025
	(0.217)	(0.202)	(0.282)	(0.156)
Poverty status?	0.115	0.119	0.149	0.148
	(0.319)	(0.324)	(0.357)	(0.356)
Most education high school or less?	0.349	0.251	0.315	0.256
	(0.477)	(0.433)	(0.464)	(0.436)
Age of head of family	40.302	30.417	32.176	29.488
	(23.354)	(8.417)	(10.393)	(6.552)
Married couple in family?	0.821	0.488	0.659	0.407
	(0.376)	(0.490)	(0.465)	(0.480)
Number of children in family	2.171	0.835	1.752	0.518
	(0.931)	(1.147)	(1.075)	(0.956)
Black, non-Hispanic?	0.186	0.193	0.243	0.199
	(0.389)	(0.395)	(0.429)	(0.399)
White, non-Hispanic?	0.755	0.745	0.682	0.746
	(0.430)	(0.436)	(0.466)	(0.436)
Other, non-Hispanic?	0.012	0.011	0.011	0.013
	(0.107)	(0.103)	(0.106)	(0.111)
Hispanic?	0.048	0.051	0.064	0.043
	(0.214)	(0.220)	(0.244)	(0.204)
Number of individuals	1701	1701	916	2190
Observations	6534	6476	3376	5205

Note: Sample means (medians for dollar amounts) are shown with standard deviations (interquartile ranges for dollar amounts) in parentheses. Dollar amounts are adjusted for inflation using the personal consumption expenditures deflator relative to 2019. Estimates are weighted using individuals' PSID core longitudinal sample weights. Of the adults not included in the estimation sample, shown in the last column, around half have missing observations for income amounts and/or food security status. These individuals are not in the main sample because they either had missing food security observations, fewer than two adult observations, or missing covariates used in the main analysis.

A2. Intensity Measures of Persistent Food Insecurity

In the main analysis, Table 1 shows intergenerational correlations of food security status by indicators summarizing any childhood exposure relative to adult food security outcomes. In this section, we extend those results by considering various measures of the intensity, or severity, of food insecurity. First, we show the correlations of mean childhood food security status exposure in Table A2, and then we return to exploring other implications of intensity measures.

The first row of Table A2 shows estimates of the marginal effect from an additional 1-point increase in the mean childhood food security raw score on early adulthood food security. An additional affirmative response per year during childhood implies a conditional increase in the adult raw score by 0.293 (0.128), or around 4.5 (2.1) percentage points higher chance of adult food

Table A2. Intergenerational Food Security Correlations by Childhood Proportion of Years with Insecurity

Early adulthood outcome:	Food security raw score		Marginal, low, or very low food secure?		Low or very low food secure?		Very low food secure?	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Conditional:	No	Yes	No	Yes	No	Yes	No	Yes
Childhood measure:	A. Full sample: Adults with or without children (n = 1701, N = 6476)							
Mean food security	0.349	0.293	0.059	0.037	0.044	0.045	0.023	0.011
raw score	(0.066)	(0.128)	(0.008)	(0.016)	(0.008)	(0.021)	(0.006)	(0.010)
Mean marginal, low, or	1.938	1.683	0.338	0.233	0.246	0.246	0.132	0.069
very low food secure	(0.360)	(0.890)	(0.050)	(0.107)	(0.045)	(0.124)	(0.033)	(0.079)
Mean low or very low	2.111	0.698	0.349	0.100	0.254	0.112	0.143	-0.011
food secure	(0.508)	(0.824)	(0.070)	(0.111)	(0.064)	(0.129)	(0.045)	(0.074)
Mean very low	3.371	4.181	0.572	0.604	0.431	0.691	0.210	0.191
food secure	(1.043)	(1.968)	(0.120)	(0.246)	(0.135)	(0.316)	(0.079)	(0.153)
Mean child food	2.636	1.181	0.434	0.228	0.320	0.186	0.178	-0.036
insecure	(0.662)	(1.475)	(0.084)	(0.187)	(0.086)	(0.216)	(0.057)	(0.124)
Childhood measure:	B. Subsample: Adults with children present (n = 916, N = 3376)							
Mean food security	0.360	0.734	0.052	0.096	0.046	0.100	0.021	0.044
raw score	(0.094)	(0.199)	(0.011)	(0.024)	(0.012)	(0.030)	(0.007)	(0.014)
Mean marginal, low, or	1.993	4.413	0.310	0.571	0.250	0.525	0.115	0.301
very low food secure	(0.490)	(1.423)	(0.073)	(0.142)	(0.059)	(0.185)	(0.038)	(0.130)
Mean low or very low	2.076	3.265	0.290	0.524	0.254	0.392	0.122	0.202
food secure	(0.695)	(1.752)	(0.102)	(0.170)	(0.083)	(0.258)	(0.052)	(0.122)
Mean very low	3.853	8.779	0.569	1.036	0.493	1.286	0.239	0.486
food secure	(1.481)	(2.898)	(0.169)	(0.404)	(0.185)	(0.433)	(0.102)	(0.181)
Mean child food	3.066	4.814	0.455	0.856	0.371	0.668	0.187	0.217
insecure	(0.971)	(2.436)	(0.119)	(0.269)	(0.121)	(0.356)	(0.069)	(0.152)

Note: Robust standard errors with family-level clustering are shown in parentheses, and PSID core longitudinal weights are used in estimation. Conditional estimates control for quadratics in age profiles, demographics, family earnings below the federal poverty line during childhood, family wealth and equity during childhood, family fixed effects common to siblings and cousins, state-level policy and macroeconomic covariates, and state and year fixed effects.

insecurity, with cluster-robust standard errors in parentheses. When interpreting the mean exposure for indicators of childhood food insecurity, the measure represents the proportion of years with that status, so the reported intergenerational coefficients essentially represent the magnitude of a change from 0 to 1, or going from no exposure to chronic exposure. Thus, the mean exposure effects in Table A2 are considerably larger than those for any exposure in Table 1 of the manuscript. For example, considering marginal, low, or very low food security in each generation, childhood exposure in all years implies a 23.3 (10.7) percentage-point increase in the chances of that adulthood status. Again, the estimates for those in early adulthood with children present look more persistent across the board, including the implication that very low food security throughout childhood raises the food security raw score in adulthood by over 8 affirmative responses and seemingly guarantees that the adult with a child present is at least marginal, low, or very low food secure (however, as discussed below, few are very low food secure each year of childhood). We reproduce the results for Table 1 in the manuscript and Table A2 using aggregated observations per individual in Table A3, where the qualitative results are consistent.

To summarize the comparisons between any exposure versus mean exposure to food insecurity in childhood, we note a few observations and connect these to related evidence shown in further extended results. First, the concept of any exposure — particularly any marginal, low, or very low food security — broadly includes any who might report an affirmative response over four years of childhood observations; those responses have a very low threshold for detection while also representing an underlying intensive exposure that is likely recurrent and sometimes frequent. Table A4 lists the mean exposure and mean raw score conditional on any observed insecurity in childhood, by severity. For those with any childhood marginal, low, or very low food security, those children spent about half of their years with that status and had an average food security raw

Table A3. Intergenerational Correlations of Aggregated Measures of Food Security Status in Adulthood and Childhood

Early adulthood outcome:	Mean food security raw score		Any marginal, low, or very low food secure?		Any low or very low food secure?		Any very low food secure?	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Conditional:	No	Yes	No	Yes	No	Yes	No	Yes
	A. Full sample: Adults with or without children (n = 1701)							
Childhood measure:								
Any marginal, low, or	1.092	0.726	0.284	0.070	0.242	0.086	0.165	0.042
very low food secure?	(0.187)	(0.479)	(0.034)	(0.143)	(0.034)	(0.126)	(0.030)	(0.083)
Any low or very low	1.229	0.745	0.290	0.156	0.243	0.159	0.194	0.086
food secure?	(0.271)	(0.586)	(0.040)	(0.167)	(0.043)	(0.139)	(0.042)	(0.117)
Any very low	1.587	1.592	0.377	0.331	0.295	0.386	0.268	0.230
food secure?	(0.418)	(0.838)	(0.043)	(0.238)	(0.067)	(0.213)	(0.072)	(0.168)
Any child food	1.233	0.249	0.331	0.160	0.250	0.154	0.188	0.034
insecure?	(0.298)	(0.783)	(0.037)	(0.177)	(0.046)	(0.147)	(0.048)	(0.140)
	B. Subsample: Adults with children present (n = 916)							
Childhood measure:								
Any marginal, low, or	1.154	1.759	0.266	0.193	0.255	0.156	0.172	0.148
very low food secure?	(0.242)	(1.631)	(0.046)	(0.288)	(0.045)	(0.383)	(0.041)	(0.217)
Any low or very low	1.340	2.128	0.259	0.271	0.256	0.309	0.203	0.263
food secure?	(0.343)	(1.279)	(0.055)	(0.274)	(0.056)	(0.282)	(0.054)	(0.228)
Any very low	1.956	1.983	0.371	0.158	0.269	0.531	0.239	0.182
food secure?	(0.689)	(1.800)	(0.051)	(0.413)	(0.090)	(0.362)	(0.091)	(0.232)
Any child food	1.475	1.369	0.359	0.277	0.289	0.518	0.216	0.133
insecure?	(0.445)	(1.616)	(0.045)	(0.388)	(0.062)	(0.389)	(0.067)	(0.225)
Early adulthood outcome:	Mean food security raw score		Mean marginal, low, very low food secure?		Mean low or very low food secure?		Mean very low food secure?	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Conditional:	No	Yes	No	Yes	No	Yes	No	Yes
	C. Full sample: Adults with or without children (n = 1701)							
Childhood measure:								
Mean food security	0.374	0.245	0.059	0.030	0.045	0.039	0.026	0.010
raw score	(0.084)	(0.155)	(0.008)	(0.025)	(0.008)	(0.024)	(0.007)	(0.016)
Mean marginal, low,	2.027	1.570	0.349	0.208	0.254	0.236	0.139	0.073
very low food secure?	(0.387)	(1.087)	(0.047)	(0.162)	(0.044)	(0.156)	(0.036)	(0.103)
Mean low or very low	2.296	0.689	0.360	0.070	0.265	0.112	0.165	0.009
food secure?	(0.581)	(1.022)	(0.064)	(0.170)	(0.063)	(0.160)	(0.051)	(0.108)
Mean very low	3.760	3.227	0.577	0.501	0.441	0.581	0.252	0.122
food secure?	(1.401)	(2.670)	(0.117)	(0.400)	(0.139)	(0.414)	(0.115)	(0.263)
Mean child food	2.873	0.855	0.446	0.157	0.332	0.164	0.203	-0.044
insecure?	(0.852)	(1.878)	(0.081)	(0.316)	(0.086)	(0.266)	(0.074)	(0.190)
	D. Subsample: Adults with children present (n = 916)							
Childhood measure:								
Mean food security	0.420	0.498	0.058	0.056	0.047	0.053	0.028	0.033
raw score	(0.121)	(0.328)	(0.010)	(0.042)	(0.011)	(0.043)	(0.010)	(0.023)
Mean marginal, low,	2.284	3.457	0.343	0.420	0.270	0.387	0.149	0.233
very low food secure?	(0.565)	(2.269)	(0.066)	(0.275)	(0.061)	(0.346)	(0.047)	(0.162)
Mean low or very low	2.625	3.208	0.358	0.369	0.289	0.297	0.185	0.238
food secure?	(0.839)	(2.034)	(0.086)	(0.246)	(0.086)	(0.226)	(0.069)	(0.177)
Mean very low	4.293	3.630	0.599	0.367	0.455	0.482	0.268	0.186
food secure?	(1.932)	(4.382)	(0.157)	(0.573)	(0.185)	(0.620)	(0.152)	(0.271)
Mean child food	3.414	4.120	0.484	0.506	0.366	0.414	0.215	0.223
insecure?	(1.292)	(3.079)	(0.109)	(0.471)	(0.122)	(0.368)	(0.102)	(0.229)

Note: Robust standard errors with family-level clustering are shown in parentheses, and PSID core longitudinal weights are used in estimation. Conditional estimates control for quadratics in age profiles, demographics, family earnings below the federal poverty line during childhood, family wealth and equity during childhood, family fixed effects common to siblings and cousins, state-level policy and macroeconomic covariates, and state and year fixed effects.

Table A4. Intensity of Childhood Food Insecurity Conditional on Levels of Any Childhood Exposure

	Any childhood exposure? (1)	Mean exposure conditional on any childhood exposure (2)	Food security raw score conditional on any childhood exposure (3)
Childhood measure:			
Marginal, low, or very low food secure	0.373	0.509	1.989
	(0.484)	(0.254)	(1.977)
Low or very low food secure	0.235	0.442	2.883
	(0.424)	(0.242)	(2.004)
Very low food secure	0.065	0.396	4.961
	(0.246)	(0.201)	(2.340)
Child food insecure	0.132	0.384	3.763
	(0.339)	(0.189)	(2.147)
Food insufficiency screener	0.063	0.345	4.460
	(0.242)	(0.179)	(2.533)
Any 1 of questions 1–3 screener block	0.369	0.506	2.009
	(0.482)	(0.253)	(1.982)

Note: Standard deviations are shown in parentheses, and PSID core longitudinal weights are used in estimation (n = 1701, N = 6476).

score of about 2 out of 18. Those with more severe forms of insecurity had lower proportions of time in each status yet showed higher average raw scores: approximately 3 out of 18 for food insecure, or 5 out of 18 for very low food secure in childhood.

Since the indicator with the lowest threshold has been informative, we additionally include different measures of food security screeners for comparison. The first is a screener question for food insufficiency indicated by sometimes or often not enough to eat (along with a question indicating the reason as a lack of money for food). About 6.3 percent of childhood families were ever food insufficient by this measure, with food security raw scores among this

Table A5. Intergenerational Correlations of Food Insufficiency in Childhood

Early adulthood outcome:	Food security raw score		Marginal, low, or very low food secure?		Low or very low food secure?		Very low food secure?	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Conditional:	No	Yes	No	Yes	No	Yes	No	Yes
Measure of insufficiency:								
Screener question	1.450	0.868	0.244	0.176	0.198	0.177	0.108	-0.030
	(0.411)	(0.989)	(0.054)	(0.100)	(0.059)	(0.142)	(0.046)	(0.085)
Questions 1–3	1.102	0.784	0.201	0.100	0.146	0.112	0.071	0.042
	(0.184)	(0.406)	(0.026)	(0.062)	(0.024)	(0.062)	(0.017)	(0.029)

Note: Robust standard errors with family-level clustering are shown in parentheses, and PSID core longitudinal weights are used in estimation (n = 1701, N = 6476). Conditional estimates control for quadratics in age profiles, demographics, family earnings below the federal poverty line during childhood, family wealth and equity during childhood, family fixed effects common to siblings and cousins, state-level policy and macroeconomic covariates, and state and year fixed effects.

group similar to those who had any very low food security. The other screener consisted of any affirmative response to the first block of three household-based questions of the food security module. This screener applied to about 37 percent of childhood families that ever affirmed one of these questions, and their conditional mean exposure and raw scores are nearly the same as children with any marginal, low, or very low food security. Table A5 presents intergenerational correlations based on these childhood measures. These screeners were only available in the earlier survey years in the PSID when we observe our childhood period for our intergenerational sample (see Tiehen, Vaughn, and Ziliak, 2020, for more details).

In order to more explicitly compare the concepts of extensive- versus intensive-margin exposure, in Table A6, we reformulate our explanatory variable into two categorical indicators, one for partial exposure to food insecurity (mean exposure greater than 0 and less than 1) and another for complete exposure (mean exposure equal to 1). Few children spend their entire childhood observations in low or very low food security (2.1 percent, with just 0.2 percent always

Table A6. Intergenerational Correlations of Early Adulthood Food Security Status and Partial or Complete Childhood Exposure to Marginal, Low, or Very Low Food Security

Early adulthood outcome:	Food security raw score		Marginal, low, or very low food secure?		Low or very low food secure?		Very low food secure?	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Conditional:	No	Yes	No	Yes	No	Yes	No	Yes
	A. Full sample: Adults with or without children (n = 1701, N = 6476)							
Partial exposure	0.975	0.724	0.188	0.094	0.132	0.106	0.061	0.038
	(0.186)	(0.392)	(0.026)	(0.061)	(0.024)	(0.062)	(0.018)	(0.028)
Complete exposure	2.006	1.733	0.296	0.199	0.250	0.210	0.144	0.091
	(0.550)	(1.061)	(0.067)	(0.119)	(0.068)	(0.143)	(0.051)	(0.102)
	B. Subsample: Adults with children present (n = 916, N = 3376)							
Partial exposure	0.896	2.376	0.164	0.280	0.126	0.320	0.042	0.137
	(0.229)	(1.001)	(0.035)	(0.120)	(0.031)	(0.141)	(0.017)	(0.070)
Complete exposure	2.245	3.739	0.285	0.441	0.263	0.304	0.153	0.334
	(0.830)	(1.786)	(0.109)	(0.146)	(0.092)	(0.217)	(0.069)	(0.168)

Note: Robust standard errors with family-level clustering are shown in parentheses, and PSID core longitudinal weights are used in estimation. Estimates control for quadratics in age profiles, demographics, family earnings below the federal poverty line during childhood, family wealth and equity during childhood, family fixed effects common to siblings and cousins, state-level policy and macroeconomic covariates, and state and year fixed effects. For the full sample in Panel A, partial exposure to childhood marginal, low, or very low food security corresponds to 32.9 percent of the sample (weighted), whereas complete exposure consists of only 4.4 percent of the sample. For the subsample with children present in Panel B, the corresponding percentages are similar yet somewhat more prevalent at 39.1 and 5.3, respectively.

observed in very low food security), so we focus results on childhood marginal, low, or very low food security. The results in Table A6 for partial exposure closely resemble those of any exposure Table 1 in the manuscript, and results for complete exposure similarly resemble the mean exposure estimates in Table A2, thus reinforcing those earlier interpretations. Further, Table A7 provides more evidence regarding continuous measures of food security intensity along with a comparison showing that these intergenerational elasticities are conditionally estimated around a magnitude between 0.183 and 0.265, which are stronger than an alternative formulation of the percentile rank of food spending-relative-to-needs across generations, which is statistically insignificant.

Table A7. Intergenerational Correlations of Continuous Measures of Food Security or Food Spending Relative to Needs

Early adulthood outcome:	Food security raw score		Latent food security		Percentile rank: Latent food security		Percentile rank: Food spending-to-needs	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Conditional:	No	Yes	No	Yes	No	Yes	No	Yes
	A. Panel full sample: Adults with or without children							
Childhood correlation	0.349	0.293	0.296	0.273	0.288	0.230	0.260	0.094
	(0.066)	(0.128)	(0.059)	(0.129)	(0.052)	(0.125)	(0.038)	(0.077)
Elasticity	0.218	0.183	0.287	0.265	0.297	0.237	0.250	0.090
p-value	[0.000]	[0.022]	[0.000]	[0.034]	[0.000]	[0.067]	[0.000]	[0.224]
Individuals	1701	1701	1701	1701	1701	1701	1701	1701
Observations	6476	6476	6476	6476	6476	6476	6001	6001
	B. Panel subsample: Adults with children present							
Childhood correlation	0.360	0.734	0.361	0.738	0.319	0.653	0.195	0.061
	(0.094)	(0.199)	(0.090)	(0.215)	(0.077)	(0.172)	(0.059)	(0.131)
Elasticity	0.237	0.484	0.242	0.495	0.307	0.629	0.208	0.066
p-value	[0.000]	[0.000]	[0.000]	[0.001]	[0.000]	[0.000]	[0.001]	[0.640]
Individuals	916	916	916	916	916	916	914	914
Observations	3376	3376	3376	3376	3376	3376	2905	2905
	C. Aggregated full sample: Adults with or without children							
Childhood correlation	0.374	0.245	0.306	0.204	0.289	0.215	0.277	0.153
	(0.084)	(0.155)	(0.072)	(0.129)	(0.049)	(0.161)	(0.036)	(0.122)
Elasticity	0.224	0.147	0.315	0.210	0.300	0.223	0.264	0.146
p-value	[0.000]	[0.115]	[0.000]	[0.116]	[0.000]	[0.182]	[0.000]	[0.213]
Individuals	1701	1701	1701	1701	1701	1701	1701	1701
Observations	1701	1701	1701	1701	1701	1701	1701	1701
	D. Aggregated subsample: Adults with children present							
Childhood correlation	0.420	0.498	0.389	0.504	0.346	0.490	0.226	0.168
	(0.121)	(0.328)	(0.104)	(0.317)	(0.070)	(0.309)	(0.054)	(0.250)
Elasticity	0.274	0.325	0.296	0.384	0.344	0.486	0.227	0.169
p-value	[0.000]	[0.130]	[0.000]	[0.112]	[0.000]	[0.113]	[0.000]	[0.501]
Individuals	916	916	916	916	916	916	916	916
Observations	916	916	916	916	916	916	916	916

Note: Robust standard errors with family-level clustering are shown in parentheses, and PSID core longitudinal weights are used in estimation. Conditional estimates control for quadratics in age profiles, demographics, family earnings below the federal poverty line during childhood, family wealth and equity during childhood, family fixed effects common to siblings and cousins, state-level policy and macroeconomic covariates, and state and year fixed effects.

Appendix B. Decomposition and Timing of Intergenerational Food Insecurity Persistence

B1. Decomposing the Total Persistence of Food Insecurity across Generations

Recall that the conditional correlations of food insecurity across generations are modeled according to equation (1) in the manuscript:

$$F_{ist} = \alpha + \beta F_{i,t_0} + \boldsymbol{w}_i'\gamma + \boldsymbol{x}_{ist}'\theta + \phi_i + \mu_s + \kappa_t + \varepsilon_{ist}.$$

For ease of exposition, consider a reformulation of this model using matrix notation and rewriting the outcome as Y, childhood food insecurity as F, and all other covariates as H:

$$Y = F\beta + H\rho + \varepsilon.$$

Let the unconditional parameter of intergenerational food insecurity persistence be labeled β_0 such that the ordinary least squares (OLS) estimator is defined as $\hat{\beta}_0 = (F'F)^{-1}F'Y$. That is, the estimator $\hat{\beta}_0$ corresponds to a base model that excludes H, whereas the OLS estimator in the full model is simply given by $\hat{\beta}$ (note that the constant is included in both the base and the full model). Gelbach (2016) provides a useful decomposition that identifies the differences between the base model estimator and the full model estimator that are attributable to covariates, or groups of covariates, in the extended set of explanatory variables for the fully specified model, which in this case is defined by H. The logic of this decomposition follows from insights on the formula for omitted variable bias. To see how this approach works, it is convenient to start with the equation $Y = F\hat{\beta} + H\hat{\rho} + \hat{\varepsilon}$, where $\hat{\varepsilon} = Y - F\hat{\beta} - H\hat{\rho}$. Then, premultiply throughout the equality by $(F'F)^{-1}F'$, which allows the following simplifications: $(F'F)^{-1}F'Y = \hat{\beta}_0$, $(F'F)^{-1}F'F\hat{\beta} = \hat{\beta}$, and $(F'F)^{-1}F'\hat{\varepsilon} = 0$ assuming conditional exogeneity in a fully specified model. The resulting equation then becomes $\hat{\beta}_0 = \hat{\beta} + (F'F)^{-1}F'H\hat{\rho}$, which rearranges to define the difference between the unconditional and conditional correlation estimators as $\hat{\beta}_0 - \hat{\beta} = (F'F)^{-1}F'H\hat{\rho}$. For the matrix H with k_H columns of variables, this equality can be rewritten as a summation across each kth covariate:

$$\hat{\beta}_0 - \hat{\beta} = \sum_{k=1}^{k_H} (F'F)^{-1} F' H_k \hat{\rho}_k \equiv \sum_{k=1}^{k_H} \widehat{\Delta}_k \equiv \widehat{\Delta}.$$

In particular, the summation shows that the total estimated difference between unconditional and conditional persistence in food insecurity, $\widehat{\Delta}$, can be decomposed into the sum of the product of two coefficients: the first coefficient is given by $(F'F)^{-1}F'H_k$, which is obtained from a regression of H_k on F, and the second coefficient is $\hat{\rho}_k$, which is estimated from equation (1) in the manuscript for the kth variable of H in the fully specified model. Therefore, estimation is straightforward and the summation can easily be grouped by subsets of H in order to decompose the total difference in $\widehat{\Delta}$ by different groups of covariates. This approach accounts for correlations between explanatory variables while avoiding the ambiguity of sequential comparisons by covariate subgroups. Gelbach (2016) provides details on estimation as well as the asymptotic distribution used for inference.

Table 1 of the manuscript shows the unconditional estimates, $\hat{\beta}_0$, in the odd-numbered columns and the conditional estimates, $\hat{\beta}$, in the even-numbered columns. Here, we use the Gelbach (2016) decomposition to quantify the degree to which total persistence of food insecurity is explained by age profiles, childhood poverty, family wealth in childhood, unobserved family fixed effects, or other control variables in our full model. Table B1 shows decomposition results corresponding to the estimates in Table 1 of the manuscript for binary indicators of food insecurity and Table A2 for the continuous food security raw score. Childhood family wealth and family fixed effects common to siblings and cousins each explain a large portion of the unconditional correlations, around one fifth in magnitude, yet the family fixed effects act as a noisy moderator.

Table B1. Decompositions of Unconditional Intergenerational Correlations of Food Security Status

Intergenerational outcome:	Food security raw score	Marginal, low, or very low food secure?	Low or very low food secure?	Very low food secure?
	(1)	(2)	(3)	(4)
	A. Full sample: Adults with or without children (n = 1701, N = 6476)			
Unconditional estimate	0.349	0.201	0.145	0.097
	(0.066)	(0.025)	(0.032)	(0.029)
Conditional estimate	0.293	0.099	0.133	0.097
	(0.128)	(0.062)	(0.076)	(0.054)
Total explained, $\widehat{\Delta}$	0.056	0.102	0.013	-0.0002
	(0.119)	(0.060)	(0.070)	(0.053)
	Decomposition of unconditional correlation explained by covariates			
Age profiles	-0.001	0.018	0.003	-0.003
	(0.021)	(0.014)	(0.010)	(0.008)
Control variables	0.071	-0.009	0.026	0.008
	(0.080)	(0.050)	(0.041)	(0.028)
Childhood family	-0.035	0.006	-0.022	-0.003
years in poverty	(0.054)	(0.025)	(0.023)	(0.018)
Childhood family	0.075	0.048	0.040	0.022
wealth	(0.053)	(0.030)	(0.028)	(0.018)
Siblings/cousins	-0.054	0.040	-0.034	-0.023
family fixed effects	(0.149)	(0.072)	(0.081)	(0.058)
	B. Subsample: Adults with children present (n = 916, N = 3376)			
Unconditional estimate	0.360	0.179	0.143	0.104
	(0.094)	(0.035)	(0.041)	(0.040)
Conditional estimate	0.734	0.303	0.419	0.204
	(0.199)	(0.127)	(0.120)	(0.082)
Total explained, $\widehat{\Delta}$	-0.374	-0.124	-0.276	-0.100
	(0.192)	(0.121)	(0.111)	(0.080)
	Decomposition of unconditional correlation explained by covariates			
Age profiles	0.024	0.043	0.041	-0.0004
	(0.033)	(0.025)	(0.027)	(0.007)
Control variables	-0.147	-0.109	-0.129	-0.020
	(0.102)	(0.068)	(0.060)	(0.047)
Childhood family	-0.146	0.029	-0.072	-0.048
years in poverty	(0.118)	(0.053)	(0.052)	(0.033)
Childhood family	-0.024	-0.027	-0.015	-0.001
wealth	(0.066)	(0.043)	(0.031)	(0.025)
Siblings/cousins	-0.081	-0.060	-0.102	-0.029
family fixed effects	(0.241)	(0.126)	(0.119)	(0.087)

Note: The childhood food security measures in each column correspond to the same definition as the adult outcome, where the childhood measure of the food security raw score is the mean across years and the status indicators represent any childhood exposure. Robust standard errors with family-level clustering are shown in parentheses, and PSID core longitudinal weights are used in estimation. Following the decomposition method described in Gelbach (2016), the unconditional correlations explained by covariates are grouped by age profiles (quadratics in average parent age, child's age as an adult, and age of the head of household), control variables (indicators for race/ethnicity, gender, number of children, and state-level poverty, unemployment, and state and year fixed effects), childhood family proportion of years with earnings below the federal poverty line, the inverse hyperbolic sine of childhood family wealth and equity, and family fixed effects common to siblings and cousins.

B2. The Timing of Childhood Exposure to Food Insecurity

To explore the potential for heterogeneity in the persistence of food insecurity by timing in childhood, the manuscript summarizes intergenerational correlations defined by exposure during specific age ranges of childhood in Figure 4. We extend those results in Table B2 by reproducing the Figure 4 results both unconditionally as well as conditionally, and by extending the results to the mean measurement of childhood exposure. Table B2 also compares the main analysis results for exposure across all ages of childhood, shown in columns (7) and (8), alongside these cuts by childhood exposure timing.

Table B2. Intergenerational Correlations of Early Adulthood Marginal, Low, or Very Low Food Security and Childhood Food Security Status by Age of Childhood Exposure

Early adulthood outcome:	Marginal, low, or very low food secure?							
Childhood observation:	Ages 0 to 5		Ages 6 to 11		Ages 12 to 17		All ages 0 to 17	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Conditional:	No	Yes	No	Yes	No	Yes	No	Yes
A. Any childhood exposure								
Marginal, low, or	0.212	0.127	0.172	0.058	0.198	0.191	0.201	0.099
very low food secure	(0.037)	(0.089)	(0.028)	(0.066)	(0.043)	(0.080)	(0.025)	(0.062)
Low or very low	0.195	-0.064	0.155	0.063	0.260	0.181	0.207	0.135
food secure	(0.043)	(0.123)	(0.040)	(0.076)	(0.055)	(0.087)	(0.034)	(0.072)
Very low food secure	0.226	-0.190	0.259	0.218	0.366	0.414	0.279	0.306
	(0.062)	(0.124)	(0.060)	(0.102)	(0.070)	(0.155)	(0.042)	(0.086)
Child food insecure	0.127	-0.096	0.239	0.172	0.188	0.188	0.210	0.115
	(0.060)	(0.141)	(0.043)	(0.066)	(0.060)	(0.102)	(0.035)	(0.078)
Individuals	762	762	1619	1619	921	921	1701	1701
Observations	2581	2581	6274	6274	3828	3828	6476	6476
B. Mean childhood exposure								
Marginal, low, or	0.252	0.212	0.257	0.159	0.229	0.198	0.338	0.233
very low food secure	(0.048)	(0.102)	(0.037)	(0.092)	(0.059)	(0.091)	(0.050)	(0.107)
Low or very low	0.212	-0.134	0.229	0.093	0.301	0.154	0.349	0.100
food secure	(0.062)	(0.130)	(0.054)	(0.112)	(0.071)	(0.102)	(0.070)	(0.111)
Very low food secure	0.289	-0.587	0.342	0.314	0.523	0.615	0.572	0.604
	(0.152)	(0.216)	(0.092)	(0.180)	(0.092)	(0.167)	(0.120)	(0.246)
Child food insecure	0.099	-0.302	0.312	0.261	0.272	0.235	0.434	0.228
	(0.079)	(0.204)	(0.069)	(0.129)	(0.082)	(0.121)	(0.084)	(0.187)
Individuals	762	762	1619	1619	921	921	1701	1701
Observations	2581	2581	6274	6274	3828	3828	6476	6476

Note: Robust standard errors with family-level clustering are shown in parentheses, and PSID core longitudinal weights are used in estimation. Conditional estimates control for quadratics in age profiles, demographics, family earnings below the federal poverty line during childhood, family wealth and equity during childhood, family fixed effects common to siblings and cousins, state-level policy and macroeconomic covariates, and state and year fixed effects.

Appendix C. Instrumental Variable Sensitivity

Section V of the manuscript uses an instrumental variable (IV) approach to identifying the childhood exposure effects of food insecurity on long-run food insecurity in early adulthood, which is interpreted as a causal pathway separate from shared within-family time-varying factors that are also predictive of adult food insecurity. We use social policy variation during childhood to estimate the effect of exogenous changes in childhood food insecurity exposure induced by state-year measures of program generosity and access. The main analysis uses two-stage least squares (2SLS) with mean childhood policy values as instruments, including Temporary Assistance for Needy Families (TANF) and SNAP real benefit generosity as well as SNAP policy index variables for noncitizen eligibility, online application access, and shorter recertification periods. In this section, we first explore the sensitivity of those 2SLS estimates from the main analysis, and we then provide some extended results.

Given that the 2SLS estimates presented in the main analysis address robustness to weak-IV identification, Table C1 provides limited information maximum likelihood (LIML) estimates as another point of comparison. For inference, Table C1 shows cluster-robust p-values constructed based on the conditional likelihood ratio (CLR) test (see Moreira, 2003; Moreira and Moreira, 2019). The LIML estimates are robust for weak-IV estimation in small samples and median-unbiased in overidentified models (Angrist and Pischke, 2008). The point estimates and magnitude of standard errors in Table C1 are similar to those in Table 2 of the manuscript. The underidentification and Hansen J statistics for Table C1 are the same as shown in Table 2, where in both cases we fail to reject that the first stage is underidentified (p-value = 0.164) for the smaller sample of adults with own children present in panel B.

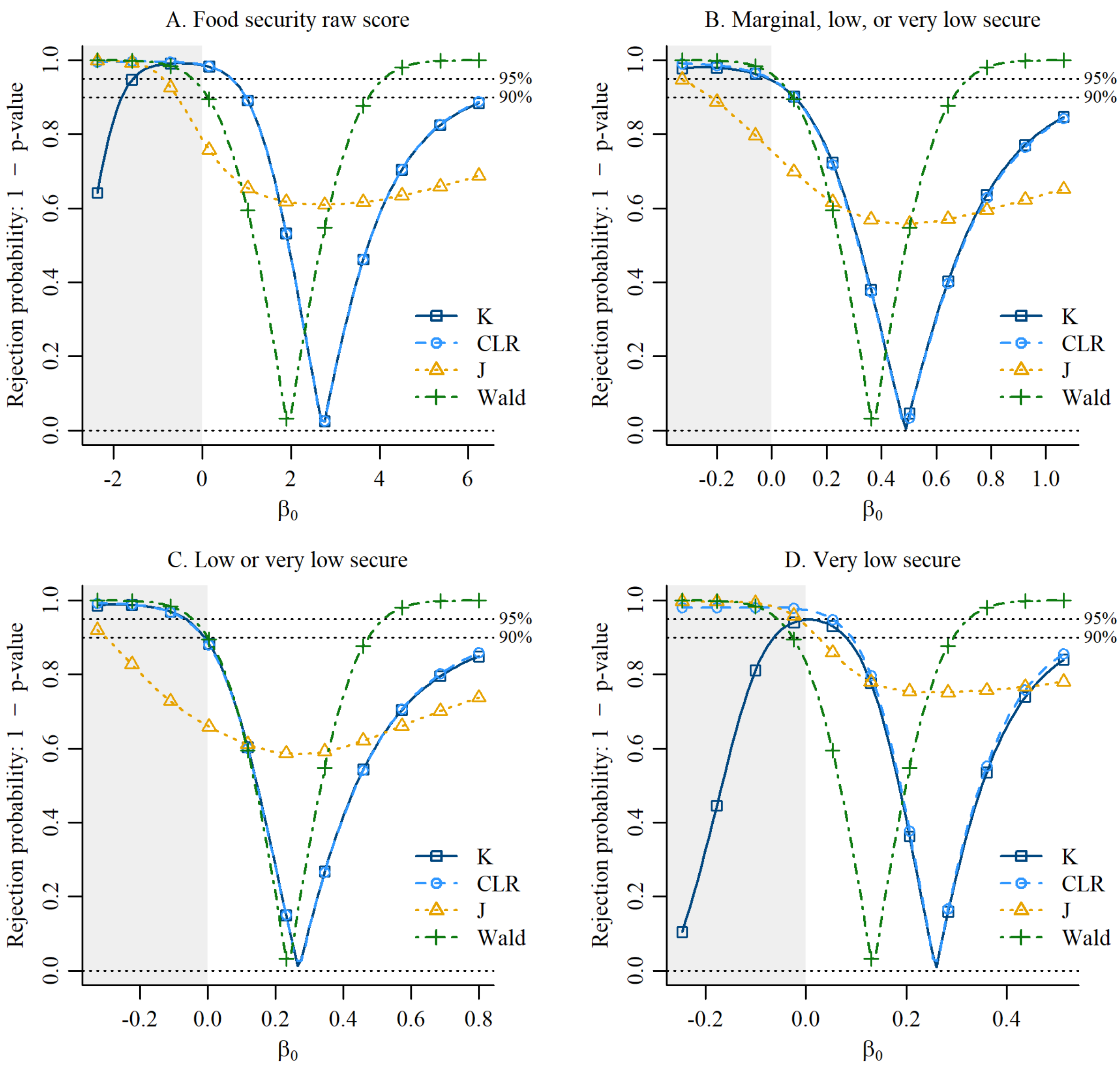
Table C1. LIML Estimates of Childhood Marginal, Low, or Very Low Food Security Effects on Early Adulthood Food Security Status

Early adulthood outcome:	Food security raw score	Marginal, low, or very low food secure?	Low or very low food secure?	Very low food secure?
	(1)	(2)	(3)	(4)
Childhood measure:	A. Full sample: Adults with or without children (n = 1701, N = 6476)			
Any marginal, low, or very low food secure?	2.146	0.405	0.257	0.147
	(1.273)	(0.203)	(0.162)	(0.111)
Cluster-robust $\hat{\beta}$ p-value	[0.012]	[0.052]	[0.115]	[0.025]
Childhood measure:	B. Subsample: Adults with children present (n = 916, N = 3376)			
Any marginal, low, or very low food secure?	3.657	0.371	0.457	0.240
	(2.751)	(0.294)	(0.313)	(0.220)
Cluster-robust $\hat{\beta}$ p-value	[0.026]	[0.197]	[0.044]	[0.030]

Note: Robust standard errors with family-level clustering are shown in parentheses, and PSID core longitudinal weights are used in estimation. Estimates control for quadratics in age profiles, demographics, family earnings below the federal poverty line during childhood, family wealth and equity during childhood, state-level policy and macroeconomic covariates, and year fixed effects. The instruments include real SNAP benefit standards, real TANF benefit standards, whether noncitizen adults are fully eligible for SNAP, whether SNAP applications are accepted online, and the proportion of SNAP units with a 1–3 month recertification period. The cluster-robust conditional likelihood ratio statistic p-value is shown for $H_0: \beta = 0$. See Table 2 in the manuscript for comparison and other IV statistics.

For inference with respect to the IV approach in the main analysis (see Table 2 of the manuscript), the standard errors are not relevant for testing because of the non-normal distribution of 2SLS estimates in the weak-IV case. Therefore, we report a cluster-robust K statistic p-value for Table 2, and correspondingly, we report a cluster-robust CLR statistic p-value for the analogous LIML estimates in Table C1, where the p-values are similar across methods. Figure C1 extends these comparisons by presenting confidence regions for both the K test and CLR test relative to the standard Wald test that is not applicable in a weak-IV setting. These cluster-robust confidence regions are constructed by test inversion for the null hypothesis $H_0: \beta = \beta_0$ across a range of values for β_0, which, in this case, is the childhood exposure effect of any marginal, low, or very low food security. For example, panel A of Figure C1 indicates that 2SLS and LIML estimates of the childhood exposure effect of any marginal, low, or very low food security on adult food security raw score have a 95-percent confidence lower bound of about 0.673 and a 90-percent confidence lower bound of 1.022. Likewise, the rejection probabilities of the K and CLR tests evaluated at zero correspond to the p-value estimates reported in Tables 2 and C1 for $H_0: \beta = \beta_0$, which are both approximately equal to 0.013 in panel A. The K, CLR, and Wald tests assume valid instruments. Figure C1 also includes J test rejection probabilities for the hypothesis of instrument exogeneity, $H_0: \mathbb{E}[\boldsymbol{z}_{i,t_0} v_{ist}] = 0$, for the assumption that $\beta = \beta_0$. For each of the outcomes shown

Figure C1. Confidence Regions for 2SLS Intergenerational Estimates
of Marginal, Low, or Very Low Food Security Effects

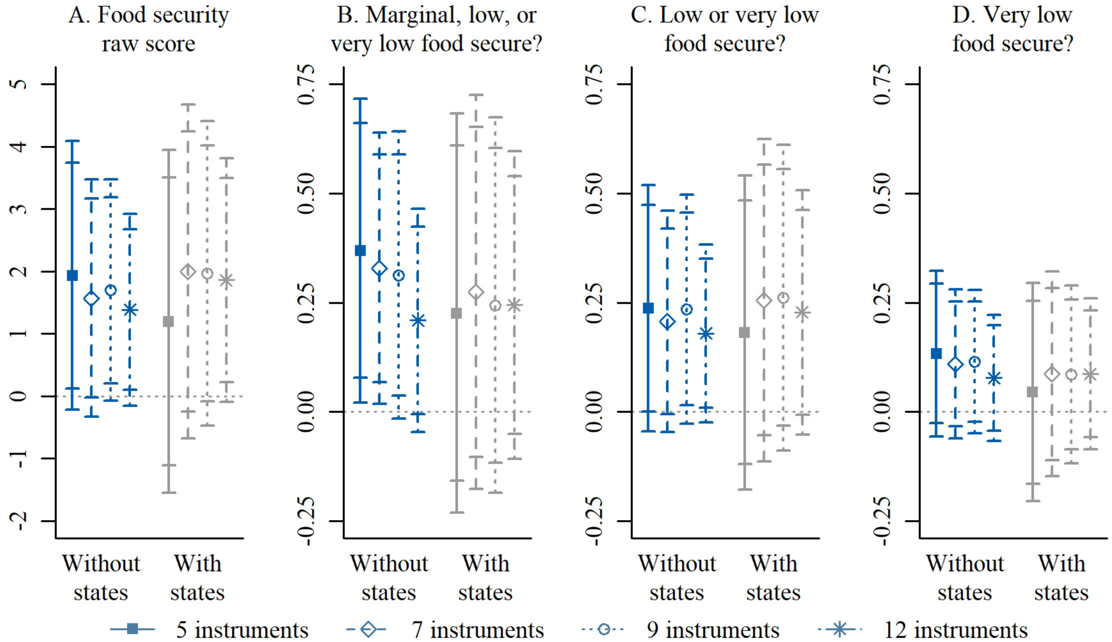


Note: The K and CLR tests of $H_0: \beta = \beta_0$ are robust to heteroskedasticity and autocorrelation (HAC), and they correspond to the 2SLS and LIML estimates of $\hat{\beta}$, respectively. The J test of $H_0: \mathbb{E}[\boldsymbol{z}_{i,t_0} v_{ist}] = 0$ is also HAC-robust. The Wald test of $H_0: \beta = \beta_0$ represents the assumption of strong first-stage identification, which corresponds to the same assumptions represented by the standard errors in Table 2 in the manuscript.

in Figure C1, the confidence set where we fail to reject valid instruments applies for all plausible values of β_0 above the corresponding cluster-robust lower bounds. For discussion on estimation with weak instruments, see Cruz and Moreira (2005), Montiel Olea and Pflueger (2013), Andrews, Stock, and Sun (2019), and Keane and Neal (2023).

The main estimates in the manuscript rely on childhood means of state-level policy instruments, which are assumed to be exogenous for the adult food security outcomes conditional on contemporaneous measures of the same policies during adulthood. Because of the potential collinearity of state fixed effects with our identifying sources of variation, we exclude state fixed effects in our main analysis and thereby improve the precision of our IV estimates. Figure C2 explores both the implications for expanding the set of policy instruments as well as the role of conditioning on state fixed effects. Despite the unreliability of standard Wald confidence intervals under weak-IV assumptions, Figure C2 shows these for ease of comparison where the main interest is on the magnitude of the point estimates across models (see Tables 2 and C1 for the respective cluster-robust p-values). The effect size of childhood exposure to any marginal, low, or very low food security on adult food security outcomes is relatively consistent across specifications, both qualitatively and quantitatively.

Figure C2. Sensitivity Analysis for 2SLS Estimates of Childhood Marginal, Low, or Very Low Food Security Effects on Early Adulthood Food Security Status



Note: Estimates control for quadratics in age profiles, demographics, family earnings below the federal poverty line during childhood, family wealth and equity during childhood, state-level policy and macroeconomic covariates, year fixed effects, and alternatively without and with state fixed effects. The 5-instrument set includes real SNAP benefit standards, real TANF benefit standards, whether noncitizen adults are fully eligible for SNAP, whether SNAP applications are accepted online, and the proportion of SNAP units with a 1–3 month recertification period. Each of the following groups use the same instruments while adding new ones to the set before. The 7-instrument set adds indicators for SNAP broad-based categorical eligibility and whether states use simplified reporting for household changes. The 9-instrument set adds indicators for whether a state excludes at least one but not all vehicles for the SNAP asset test and whether there is a statewide requirement of fingerprinting for SNAP applicants. The 12-instrument set adds total state-level SNAP outreach spending in inflation-adjusted per-capita dollars, an indicator for whether a state excludes all vehicles from the SNAP asset test, and the proportion of SNAP benefits issued by electronic benefit transfer (EBT). PSID core longitudinal weights are used in estimation. The lines show 90- and 95- percent confidence intervals based on family-level clustering.

Appendix D. Addressing Life-Cycle Bias in Intergenerational Food Insecurity Persistence

As noted in Section II of the manuscript, the literature on economic mobility has been concerned with life-cycle bias related to observing incomplete windows of outcomes of interest (see Grawe, 2006; Solon, 1992; Wolfe et al., 1996). With respect to estimating the intergenerational elasticity of income, for example, observing a small window of income at earlier ages of adulthood can provide an understated proxy for lifetime income. Based on the permanent income hypothesis, individuals and families are assumed to smooth consumption over time such that the *permanent income* concept is more economically relevant for understanding family well-being (Friedman, 1957). However, when estimating the intergenerational persistence of food insecurity, the early adulthood window represents a key moment of interest when individuals are experiencing major life transitions and are most likely to be economically vulnerable and potentially food insecure. In that respect, the main estimates in Tables 1 and 2 of the manuscript represent the appropriate magnitudes for interpreting the implications of long-term family hardship. Moreover, the instances of food insecurity observed in adulthood are directly indicative of the household's inability to smooth consumption across time periods. However, Lee and Solon (2009) propose a life-cycle adjustment that offers a sensitivity check on the magnitudes of intergenerational effects that may vary by age in adulthood.

Following Lee and Solon (2009), we re-estimate our conditional correlations and 2SLS model while including a quartic in the normalized age of the child-as-an-adult along with interactions between this quartic in age and the measure of childhood food insecurity, and these estimates also control for a quartic in the parents' mean ages during the observed childhood period. Table D1 panel A corresponds to the main conditional correlations from Table 1 panel A — the even-numbered columns — in the manuscript, and Table D1 panel B corresponds to the 2SLS estimates from Table 2 panel A. The conditional correlations after applying the Lee-Solon life-cycle adjustments are within 5 percent above or below the unadjusted correlations. The 2SLS estimates in columns (1)–(2) of Table D1 are about 33 percent smaller after life-cycle adjustments, and the estimates for more severe adult measures of insecurity are about 44 percent smaller. The 2SLS results are still qualitatively similar in the magnitude of effects and remain larger than the corresponding conditional correlations. For the estimates shown in Table D1, the individuals' ages in early adulthood are normalized by subtracting 25, recentering ages near the mid-point of observed ages in early adulthood for this sample. However, in results not shown here, these estimates are not sensitive to the choice for recentering around any age from 19 to 35.

Table D1. Life-Cycle-Adjusted Intergenerational Conditional Correlations and 2SLS Estimates for Childhood Food Security Status and Early Adulthood Outcomes Potentially Related to Adult Food Insecurity

Early adulthood outcome:	Food security raw score	Marginal, low, or very low food secure?	Low or very low food secure?	Very low food secure?
	(1)	(2)	(3)	(4)
Childhood measure:	A. Conditional correlations, by childhood food security status			
Any marginal, low, or very low food secure?	0.798	0.105	0.113	0.043
	(0.405)	(0.062)	(0.062)	(0.030)
Any low or very low food secure?	0.829	0.141	0.136	0.035
	(0.490)	(0.072)	(0.076)	(0.041)
Any very low food secure?	1.712	0.304	0.296	0.090
	(0.650)	(0.087)	(0.102)	(0.052)
Any child food insecure?	0.348	0.112	0.077	-0.032
	(0.607)	(0.081)	(0.088)	(0.055)
Childhood measure:	B. 2SLS estimated effects of any childhood marginal, low, or very low food security			
Any marginal, low, or very low food secure?	1.239	0.248	0.141	0.079
	(0.980)	(0.144)	(0.125)	(0.095)

Note: Robust standard errors with family-level clustering are shown in parentheses, and PSID core longitudinal weights are used in estimation (n = 1701, N = 6476). Estimates control for quadratics in age profiles, demographics, family earnings below the federal poverty line during childhood, family wealth and equity during childhood, state-level policy and macroeconomic covariates, year fixed effects, and, for correlations only, family fixed effects common to siblings and cousins and state fixed effects. The instruments include real SNAP benefit standards, real TANF benefit standards, whether noncitizen adults are fully eligible for SNAP, whether SNAP applications are accepted online, and the proportion of SNAP units with a 1–3 month recertification period. The IV statistics shown include a heteroskedasticity-robust weak-IV F statistic, the Montiel Olea and Pflueger (2013) cluster-robust effective F statistic, a cluster-robust K statistic p-value for $H_0: \beta = 0$, the Kleibergen and Paap (2006) underidentification rank statistic, and the Hansen J statistic for valid instruments given overidentifying restrictions.

Appendix E. Intergenerational Correlations by Childhood Food Security Module Items

The main analysis explores the impact of any childhood exposure to marginal, low, or very low food security on specific food security module items in adulthood (see Figure 5). As an extension, Table E1 shows correlations between each food security module item in childhood with adult measures of food security, where the childhood measures represent any exposure to an affirmation of each question on food security. Whereas Figure 5 in the manuscript reports 2SLS estimates, first-stage identification is more difficult for individual module items, especially those less frequently reported. However, the correlational evidence suggests patterns where more severe forms of childhood insecurity, such as skipping meals or not eating for a day, are more strongly associated with long-run insecurity in adulthood, which aligns with findings from the main results in Tables 1 and A2.

Table E1. Intergenerational Correlations of Childhood Food Security Module Questionnaire Responses and Early Adulthood Food Security Status

Early adulthood outcome:	Food security raw score		Marginal, low, or very low food secure?		Low or very low food secure?		Very low food secure?	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Conditional:	No	Yes	No	Yes	No	Yes	No	Yes
Childhood measure:	A. Full sample: Adults with or without children (n = 1701, N = 6476)							
1. Worried food	1.134	0.943	0.209	0.127	0.147	0.134	0.076	0.049
would run out?	(0.197)	(0.430)	(0.027)	(0.059)	(0.025)	(0.066)	(0.019)	(0.033)
2. Food did	1.274	0.463	0.224	0.082	0.161	0.078	0.085	-0.003
not last?	(0.242)	(0.403)	(0.030)	(0.063)	(0.030)	(0.063)	(0.024)	(0.031)
3. Could not afford	1.246	0.887	0.199	0.149	0.161	0.149	0.078	0.030
balanced meals?	(0.296)	(0.482)	(0.038)	(0.065)	(0.036)	(0.076)	(0.027)	(0.041)
4. Cut size of meals	1.012	1.326	0.204	0.211	0.131	0.186	0.064	0.081
or skip meals?	(0.260)	(0.621)	(0.036)	(0.079)	(0.037)	(0.099)	(0.022)	(0.050)
5. How often cut	1.204	1.457	0.234	0.173	0.164	0.221	0.067	0.071
size or skipped?	(0.319)	(0.760)	(0.041)	(0.092)	(0.046)	(0.120)	(0.026)	(0.057)
6. Eat less than	0.899	1.129	0.187	0.142	0.119	0.189	0.055	0.086
you should?	(0.250)	(0.484)	(0.039)	(0.077)	(0.036)	(0.077)	(0.021)	(0.037)
7. Ever hungry	1.433	2.362	0.235	0.229	0.183	0.312	0.116	0.172
and did not eat?	(0.467)	(0.744)	(0.066)	(0.094)	(0.064)	(0.134)	(0.045)	(0.052)
8. Lose weight	0.789	1.505	0.215	0.153	0.102	0.230	0.033	0.051
because not enough?	(0.385)	(0.998)	(0.057)	(0.117)	(0.064)	(0.173)	(0.031)	(0.076)
9. Ever not eat	1.463	3.601	0.203	0.399	0.173	0.565	0.096	0.173
for a whole day?	(0.912)	(0.783)	(0.142)	(0.074)	(0.121)	(0.150)	(0.060)	(0.046)
10. How often	2.484	3.621	0.406	0.440	0.305	0.583	0.153	0.165
did not eat for a day?	(0.793)	(0.798)	(0.066)	(0.062)	(0.108)	(0.146)	(0.058)	(0.048)
11. Relied on	1.196	1.017	0.211	0.140	0.143	0.143	0.084	0.049
low-cost food?	(0.271)	(0.507)	(0.034)	(0.067)	(0.034)	(0.074)	(0.026)	(0.044)
12. Could not afford	1.235	0.388	0.222	0.122	0.160	0.071	0.078	-0.020
balanced meals?	(0.256)	(0.559)	(0.033)	(0.073)	(0.036)	(0.082)	(0.025)	(0.052)
13. Did not eat	1.236	1.422	0.203	0.187	0.163	0.219	0.075	0.067
enough?	(0.424)	(0.729)	(0.053)	(0.116)	(0.058)	(0.113)	(0.031)	(0.054)
14. Cut size of	1.181	0.565	0.214	0.204	0.155	0.129	0.079	0.020
meals?	(0.482)	(0.739)	(0.059)	(0.139)	(0.054)	(0.121)	(0.042)	(0.080)
15. Ever hungry, could	1.854	-1.140	0.296	-0.297	0.302	-0.198	0.124	-0.136
not afford more?	(0.503)	(1.605)	(0.117)	(0.151)	(0.093)	(0.177)	(0.050)	(0.178)
16. Ever skip	1.102	-1.351	0.059	-0.313	0.125	-0.217	0.060	-0.166
a meal?	(0.703)	(2.235)	(0.107)	(0.204)	(0.096)	(0.244)	(0.068)	(0.245)
17. How often	1.728	2.304	0.277	0.200	0.269	0.441	0.145	0.161
skipped a meal?	(0.650)	(0.694)	(0.075)	(0.130)	(0.098)	(0.103)	(0.077)	(0.043)
18. Ever not eat	3.474	2.826	0.344	0.148	0.418	0.238	0.414	0.427
for a while day?	(1.066)	(0.734)	(0.121)	(0.127)	(0.092)	(0.096)	(0.036)	(0.073)

Note: Robust standard errors with family-level clustering are shown in parentheses, and PSID core longitudinal weights are used in estimation. Conditional estimates control for quadratics in age profiles, demographics, family earnings below the federal poverty line during childhood, family wealth and equity during childhood, family fixed effects common to siblings and cousins, state-level policy and macroeconomic covariates, and state and year fixed effects.

Table E1 (continued). Intergenerational Correlations of Childhood Food Security Module Questionnaire Responses and Early Adulthood Food Security Status

Early adulthood outcome:	Food security raw score		Marginal, low, or very low food secure?		Low or very low food secure?		Very low food secure?	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Conditional:	No	Yes	No	Yes	No	Yes	No	Yes
Childhood measure:	B. Subsample: Adults with children present (n = 916, N = 3376)							
1. Worried food	1.087	2.631	0.182	0.296	0.136	0.326	0.059	0.171
would run out?	(0.252)	(0.930)	(0.036)	(0.115)	(0.033)	(0.124)	(0.019)	(0.073)
2. Food did	1.395	2.035	0.212	0.240	0.174	0.286	0.083	0.138
not last?	(0.303)	(0.829)	(0.042)	(0.120)	(0.039)	(0.118)	(0.024)	(0.050)
3. Could not afford	1.428	2.792	0.199	0.364	0.188	0.406	0.079	0.138
balanced meals?	(0.349)	(0.991)	(0.049)	(0.135)	(0.044)	(0.144)	(0.026)	(0.063)
4. Cut size of meals	1.336	3.540	0.212	0.461	0.179	0.482	0.069	0.222
or skip meals?	(0.427)	(0.956)	(0.062)	(0.116)	(0.058)	(0.135)	(0.030)	(0.063)
5. How often cut	1.675	3.749	0.235	0.447	0.234	0.545	0.097	0.241
size or skipped?	(0.555)	(0.981)	(0.071)	(0.128)	(0.075)	(0.134)	(0.038)	(0.063)
6. Eat less than	0.927	3.077	0.179	0.419	0.119	0.429	0.044	0.190
you should?	(0.374)	(0.898)	(0.057)	(0.109)	(0.052)	(0.128)	(0.025)	(0.061)
7. Ever hungry	1.456	4.221	0.205	0.427	0.192	0.567	0.088	0.292
and did not eat?	(0.652)	(1.154)	(0.093)	(0.180)	(0.090)	(0.186)	(0.042)	(0.063)
8. Lose weight	0.916	5.731	0.215	0.610	0.136	0.822	0.033	0.316
because not enough?	(0.617)	(1.499)	(0.100)	(0.255)	(0.098)	(0.239)	(0.039)	(0.099)
9. Ever not eat	2.090	7.464	0.239	0.845	0.261	1.050	0.149	0.463
for a whole day?	(1.232)	(1.204)	(0.175)	(0.227)	(0.162)	(0.214)	(0.078)	(0.075)
10. How often	3.652	7.809	0.491	0.952	0.468	1.121	0.245	0.472
did not eat for a day?	(0.972)	(1.149)	(0.078)	(0.161)	(0.118)	(0.182)	(0.070)	(0.085)
11. Relied on	1.091	3.417	0.176	0.488	0.135	0.456	0.057	0.208
low-cost food?	(0.328)	(0.843)	(0.046)	(0.091)	(0.042)	(0.106)	(0.025)	(0.074)
12. Could not afford	1.330	1.982	0.211	0.378	0.171	0.312	0.067	0.063
balanced meals?	(0.347)	(1.088)	(0.050)	(0.130)	(0.048)	(0.150)	(0.024)	(0.075)
13. Did not eat	1.712	3.968	0.241	0.481	0.231	0.568	0.103	0.228
enough?	(0.681)	(1.225)	(0.085)	(0.162)	(0.091)	(0.166)	(0.046)	(0.082)
14. Cut size of	1.468	1.300	0.259	0.335	0.165	0.178	0.084	0.062
meals?	(0.769)	(1.068)	(0.081)	(0.144)	(0.073)	(0.128)	(0.064)	(0.087)
15. Ever hungry, could	2.182	2.107	0.368	0.012	0.376	0.174	0.147	0.175
not afford more?	(0.396)	(1.589)	(0.109)	(0.181)	(0.078)	(0.172)	(0.057)	(0.133)
16. Ever skip	1.697	4.415	0.113	0.421	0.200	0.339	0.041	0.378
a meal?	(0.661)	(3.428)	(0.086)	(0.104)	(0.086)	(0.269)	(0.079)	(0.284)
17. How often	1.633	4.372	0.308	0.622	0.291	0.777	0.080	0.229
skipped a meal?	(0.882)	(1.892)	(0.109)	(0.211)	(0.143)	(0.216)	(0.054)	(0.119)
18. Ever not eat	6.395	8.029	0.638	0.558	0.665	0.461	0.505	0.667
for a while day?	(0.227)	(1.290)	(0.065)	(0.202)	(0.044)	(0.164)	(0.022)	(0.117)

Note: Robust standard errors with family-level clustering are shown in parentheses, and PSID core longitudinal weights are used in estimation. Conditional estimates control for quadratics in age profiles, demographics, family earnings below the federal poverty line during childhood, family wealth and equity during childhood, family fixed effects common to siblings and cousins, state-level policy and macroeconomic covariates, and state and year fixed effects.

APPENDIX REFERENCES

Andrews, I., J.H. Stock, and L. Sun. 2019. "Weak instruments in instrumental variables regression: Theory and practice." *Annual Review of Economics*, 11: 727–753.

Angrist, J.D., and J.-S. Pischke. 2008. *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton, NJ: Princeton University Press.

Coleman-Jensen, A., M.P. Rabbitt, C.A. Gregory, and A. Singh. 2021. "Household food security in the United States in 2020." Economic Research Report 298, U.S. Department of Agriculture, Economic Research Service.

Cruz, L.M., and M.J. Moreira. 2005. "On the validity of econometric techniques with weak instruments: Inference on returns to education using compulsory school attendance laws." *Journal of Human Resources*, XL (2): 393–410.

Friedman, M. 1957. "The permanent income hypothesis." In *A Theory of the Consumption Function*. M. Friedman (ed.), Princeton, NJ: Princeton University Press, 20–37.

Gelbach, J. 2016. "When do covariates matter? And which ones, and how much?" *Journal of Labor Economics*, 34 (2): 509–543.

Grawe, N. 2006. "Lifecycle bias in estimates of intergenerational earnings persistence." *Labour Economics*, 13 (5): 551–570.

Keane, M., and T. Neal. 2023. "Instrument strength in IV estimation and inference: A guide to theory and practice." *Journal of Econometrics*, 235 (2): 1625–1653.

Kleibergen, F., and R. Paap. 2006. "Generalized reduced rank tests using the singular value decomposition." *Journal of Econometrics*, 133 (1): 97–126.

Lee, C. and G. Solon. 2009. "Trends in intergenerational income mobility." *Review of Economics and Statistics*, 91 (4): 766–772.

Montiel Olea, J.L., and C. Pflueger. 2013. "A robust test for weak instruments." *Journal of Business and Economic Statistics*, 31 (3): 358–369.

Moreira, M.J. 2003. "A conditional likelihood ratio test for structural models." *Econometrica*, 71 (4): 1027–1048.

Moreira, H., and M.J. Moreira. 2019. "Optimal two-sided tests for instrumental variables regression with heteroskedastic and autocorrelated errors." *Journal of Econometrics*, 213 (2): 398–433.

Panel Study of Income Dynamics. 2023. Public use dataset. Survey Research Center, Institute for Social Research, University of Michigan, Ann Arbor, MI.

Solon, G. 1992. "Intergenerational income mobility in the United States." *American Economic Review*, 82 (3): 393–408.

Tiehen, L., C. Vaughn, and J.P. Ziliak. 2020. "Food insecurity in the PSID: A comparison with the levels, trends, and determinants in the CPS 1999–2017." *Journal of Economic and Social Measurement*, 45 (2): 103–138.

Wolfe, B.L., R. Haveman, D. Ginther, and C.B. An. 1996. "The 'window problem' in studies of children's attainments: A methodological exploration." *Journal of the American Statistical Association*, 91 (435): 970–982.