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# Effects Of The 2021 Expanded Child Tax Credit On Adults' Mental Health: A Quasi-Experimental Study

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**ABSTRACT** The US Congress temporarily expanded the Child Tax Credit (CTC) during the COVID-19 pandemic to provide economic assistance for families with children. Although formerly the CTC provided \$2,000 per child for mostly middle-income parents, during July–December 2021 it provided up to \$3,600 per child. Eligibility criteria were also expanded to reach more economically disadvantaged families. There has been little research evaluating the effect of the policy expansion on mental health. Using data from the Census Bureau's Household Pulse Survey and a quasi-experimental study design, we examined the effects of the expanded CTC on mental health and related outcomes among low-income adults with children, and by racial and ethnic subgroup. We found fewer depressive and anxiety symptoms among low-income adults. Adults of Black, Hispanic, and other racial and ethnic backgrounds demonstrated greater reductions in anxiety symptoms compared to non-Hispanic White adults with children. There were no changes in mental health care use. These findings are important for Congress and state legislators to weigh as they consider making the expanded CTC and other similar tax credits permanent to support economically disadvantaged families.

**D**uring the COVID-19 pandemic, there was a rapid rise in anxiety and depressive symptoms, disproportionately affecting economically disadvantaged families and Black and Hispanic people.<sup>1</sup> In June 2020, 37.8 percent of White adults reported adverse mental or behavioral health symptoms, compared with 44.2 percent of Black adults and 52.1 percent of Hispanic adults.<sup>2</sup> Racial and ethnic minority groups were at increased risk for chronic stress during the pandemic, as they were more likely to experience financial hardships and exacerbations of long-standing inequities in income, housing, and other social determinants of mental health.<sup>3–7</sup> Because poverty and financial hardship are major risk factors for stress and mental health problems, it is imperative to iden-

tify population-level policies to improve mental well-being among at-risk groups. Economic policies have the potential to affect mental health by addressing social determinants of mental health such as poverty, food insecurity, and health care access<sup>8–10</sup> (see the conceptual diagram in online appendix exhibit A1).<sup>11</sup> These mechanisms and mental health itself can then affect physical health in the long run.<sup>12</sup>

In response to the financial hardship caused by the pandemic, in July 2021 the US government temporarily expanded the Child Tax Credit (CTC), an economic support program for families with children, as part of the American Rescue Plan Act.<sup>13</sup> The CTC was established in 1997 to provide financial relief for middle-income families. Although formerly the CTC provided up to \$2,000 per child, as part of the temporary 2021

expansion it provided a maximum of \$3,600 per child and was available to low-income and unemployed parents as well. In addition, instead of being transferred in the form of an annual tax refund, in 2021 it was disbursed as monthly advance payments that were automatically transferred into the bank accounts of eligible families who had filed taxes in 2019 or 2020. Before the CTC expansion, the credit was not fully refundable—consequently, one-third of American children did not receive the full value of the benefit because their families did not earn enough.<sup>14</sup> In other words, those with low or no tax liability did not receive the payments. Children with single parents, children living in rural areas, Black and Hispanic children, and children in larger families were disproportionately ineligible.<sup>14,15</sup> In contrast, about 90 percent of children were eligible for the expanded CTC, which was fully refundable, and benefits were larger for lower-income families.<sup>16</sup>

There has been limited work examining the effects of the expanded CTC, with studies suggesting that it reduced child poverty by nearly half, as well as reducing material hardship and food insufficiency.<sup>17–22</sup> There is more evidence on the health effects of another major poverty alleviation program for low-income families with children, the Earned Income Tax Credit (EITC). For example, the EITC has been shown to improve family income, housing, and access to health insurance, as well as to improve stress and mental health.<sup>23–30</sup> Studies suggest that the EITC has particularly benefited Black families.<sup>8,31</sup> Yet the EITC is disbursed as an annual refund, rather than monthly payments, and people must be employed to receive it, so EITC studies do not necessarily generalize to the potential impacts of the expanded CTC, with its monthly payments and near-universality (including broader coverage of immigrant families).

This study addressed this critical gap by examining whether the 2021 CTC expansion improved mental health among adults with children, specifically among low-income people and members of racial and ethnic minority groups. Because of historical marginalization and structural racism, these groups have less wealth and lower income, on average, than higher-income and White people and therefore may have benefited more from this new financial resource. The expanded CTC expired at the end of 2021, and Congress continues to debate whether to make the expansion permanent, while state governments consider their own similar programs.<sup>32</sup> Evidence is therefore urgently needed to inform such conversations.

## Study Data And Methods

**SAMPLE** The sample was drawn from the Census Bureau's Household Pulse Survey, a nationally representative repeated cross-sectional internet survey that began in April 2020 and continues weekly through the present.<sup>33</sup> The Census Bureau randomly selects survey participants from the Master Address File; participants then complete an internet-based survey. We used data from waves 28–41 (April 14, 2021–January 10, 2022) ( $N = 944,189$ ). Because the first monthly payment for the expanded CTC was made July 15, 2021 (just before wave 34), and the last payment was made December 15, 2021 (during wave 41), this provided six waves of prepolicy data and seven waves of postpolicy data. Of note, a final larger lump-sum CTC payment was made during the spring of 2022 to those who filed taxes or claimed economic impact payments; our approach excluded observations during this period because of the ambiguity regarding the definition of the exposure period and potential recipients. Finally, we restricted the sample to respondents who provided responses on the mental health outcomes of interest, for a final sample size of 812,314.

This study involved publicly available deidentified data. Ethical approval was not required.

**EXPOSURE** CTC-eligible adults with children younger than age eighteen whose interviews occurred during July 2021–January 2022 were considered “exposed” to the expanded CTC. Furthermore, those with lower incomes were considered to have received the strongest exposure, as their benefits were larger than those of people with higher incomes.

In particular, the 2021 expansion increased CTC benefits from a maximum of \$2,000 to a maximum of \$3,600 per child for children younger than age six and up to \$3,000 per child for children ages 6–17. Instead of being disbursed as part of an annual tax refund, the payment mode was changed to monthly advance payments. The full credit was available to single filers, heads of household, and married couples filing jointly with modified adjusted gross incomes lower than \$75,000, \$112,500, and \$150,000, respectively, for the 2021 tax year. This included those with zero earned income. The credit was phased out when income exceeded these thresholds. The first phase-out occurred when income exceeded these thresholds but was below \$400,000 (married filing jointly) or \$200,000 (all other filing statuses). The total credit per child was reduced by \$50 for each \$1,000 (or a fraction thereof). The credit would not be reduced below \$2,000 under this phase-out. The second phase-out applied to taxpayers with income more than \$400,000 (married filing jointly) or \$200,000

(other filing statuses). In this phase-out, the total credit per child was reduced \$50 for each \$1,000, and the credit could drop below \$2,000 until it reached \$0. Before the 2021 expansion the CTC was not available to those with earnings below \$2,500, and those with lower incomes did not earn enough to qualify for the full amount (that is, it was not fully refundable).<sup>34</sup> Because of the changes to eligibility criteria made in 2021, about 90 percent of American families with children (approximately thirty-nine million households) were eligible to receive payments beginning July 15, 2021.<sup>35</sup>

This analysis is analogous to an intent-to-treat design, in which we captured the average treatment effect on the eligible US population, the majority of whom received the credit but a fraction of whom did not.<sup>36</sup> This is an approach similar to prior studies of the EITC and other safety-net programs for which administrative data on benefit receipt are unavailable.<sup>8,25,26,37</sup> Notably, 65.4 percent of our sample who seemed eligible on the basis of their self-reported demographic characteristics reported that they received the CTC, which indicates that our approach may have involved some degree of measurement error. In addition, prior work has indicated that self-reported receipt of safety-net benefits is unreliable; this may especially be the case if people were not aware of the automatic deposits into their bank accounts.<sup>38</sup>

**OUTCOMES** We included several mental health outcomes measured in the Household Pulse Survey. First, depressive symptoms were captured using the two-item Patient Health Questionnaire (PHQ-2). In the PHQ-2, respondents are asked how often they have been bothered by having little interest or pleasure in doing things and feeling down, depressed, or hopeless. Answers range from “not at all” to “nearly every day.” The two items are typically combined, and scores of 3 or higher indicate high risk for depression.<sup>39</sup> Second, the two-item Generalized Anxiety Disorder (GAD-2) scale is a brief screening tool for generalized anxiety disorder. People are asked whether they are feeling nervous, anxious, or on edge and not able to control or stop worrying in the past two weeks, and again how often they experience these symptoms.<sup>40</sup> A GAD-2 score of 3 or higher is considered high risk for anxiety.

We also included two binary outcomes capturing mental health care use, including mental health counseling or therapy within the past four weeks and medication to help with emotions, behavior, or concentration.

**COVARIATES** We adjusted models for variables representing potential confounders of the relationship between CTC receipt and the outcomes: sex, marital status, education, income, race and

## The mental health benefits of the CTC expansion were largest among adults of Black, Hispanic, and other (non-Asian) racial and ethnic backgrounds.

ethnicity, and number of children. We also included fixed effects for biweekly survey wave to account for secular trends in mental health that occurred during this period as a result of underlying factors affecting all participants.

**PRIMARY ANALYSIS** We first calculated descriptive statistics stratified by whether households included children and whether the interview was conducted after the CTC expansion. We then estimated the effect of the expansion using a difference-in-difference-in-differences (that is, triple-difference) approach. Triple-difference analysis builds on traditional difference-in-differences analysis, which is a quasi-experimental technique suited to examining the effects of policy changes while accounting for underlying trends.<sup>41,42</sup> These methods compare pre-post changes in outcomes among a “treatment” group (adults with children) while “differencing out” underlying secular trends in outcomes in a “control” group (adults without children). Triple-difference analysis enables further refinement of the treatment and control groups to estimate the effects on subgroups most affected by the policy. Specifically, we included an additional set of interaction terms between the primary exposure variable and a binary variable for whether a person’s income was less than \$35,000. This is because the lowest-income households were the primary beneficiaries of the expanded CTC, as they were more likely to be newly eligible and to receive the largest payments.

The triple-interaction term in difference-in-difference-in-differences models was therefore composed of three variables: an indicator for whether the interview occurred after (versus before) the CTC expansion, an indicator variable for adults with (versus without) children, and an indicator variable for whether the person

belonged to a lower-income (versus higher-income) group. The equation for the analysis and additional details about model assumptions are in the appendix, including appendix exhibits A2–A4.<sup>11</sup>

#### SECONDARY ANALYSES

► **SUBGROUP ANALYSES:** We evaluated whether the CTC had a greater impact on mental health among racial and ethnic subgroups that may be more likely to benefit from the income boost. To do so, we conducted additional difference-in-difference-in-differences analyses, including an interaction term between race and ethnicity and the primary exposure variable (that is, the interaction between pre-post expansion and adults with versus without children).

► **SENSITIVITY ANALYSES:** We conducted two sensitivity analyses. First, we assessed whether there were changes in the effects of the monthly CTC payments over time (for example, whether mental health improved initially but then returned to baseline). To do so, we modified the main analysis to include a categorical variable for the biweekly survey wave instead of using a binary pre-post variable to represent time. Second, to account for missing values for key covariates, we conducted multiple imputation using chained equations (see the appendix).<sup>11</sup>

**LIMITATIONS** This study had several limitations. One was that the Household Pulse Survey is a repeated cross-sectional survey, so we could not observe changes in specific individuals' mental health after they received CTC benefits as we could in a panel data set. In addition, the Household Pulse Survey suffers from a high rate of nonresponse, as seen with many other national surveys; results therefore might not generalize to those not included in this study. Another limitation was that covariates and outcomes were self-reported and may suffer from standard reporting biases. Finally, as with any difference-in-differences analysis, there may have been residual confounding based on contemporaneous policy changes or other exposures that differentially affected the treatment and control groups; we evaluated several model assumptions to lessen concerns about this issue (see the appendix).<sup>11</sup>

## Study Results

**SAMPLE CHARACTERISTICS** The final sample included adults with children (the treatment group; 112,862 observations before and 145,429 after the CTC expansion) and adults without children (the control group; 237,901 observations before and 316,122 after the expansion) (exhibit 1). Adults with children were more likely to be younger, married, less educated, Black, and Hispanic compared to adults without children. In-

dicators of mental health were worse among adults with children. Importantly, difference-in-differences analysis does not require that characteristics of the treatment and control groups be similar, but rather that trends (that is, slopes) in outcomes be parallel during the preeexpansion period. Descriptions of the results of analyses to evaluate the validity of model assumptions are in the appendix.<sup>11</sup>

**EFFECTS OF CTC EXPANSION** The CTC expansion was associated with decreased depressive (−1.7 percentage points; 95% confidence interval: −2.6, −0.7) and anxiety (−3.4 percentage points; 95% CI: −4.5, −2.4) symptoms among low-income adults with children (exhibit 2). We did not observe an association with the use of mental health services or prescriptions.

**SECONDARY ANALYSES** In subgroup analyses by race and ethnicity (exhibit 3), there was a larger decrease in anxiety symptoms among Black adults with children than among White adults with children (interaction term coefficient for Black versus White, −2.3; 95% CI: −3.9, −0.7). Hispanic adults and adults from other racial and ethnic groups also experienced greater reductions in anxiety compared with White adults (interaction term coefficient for Hispanic adults, −2.3 [95% CI: −3.9, −0.7]; interaction term coefficient for other racial and ethnic groups, −3.3 [95% CI: −5.2, −1.4]). There were no differences for Asian families compared with White families for any outcomes (exhibit 3), and there were no significant differences by race and ethnicity in mental health care use (appendix exhibit A5).<sup>11</sup>

In the secondary analysis in which we examined whether the mental health effects of monthly CTC payments changed over time, anxiety symptoms lessened, on average, soon after the payments started and remained relatively stable over time (appendix exhibit A6).<sup>11</sup> Depressive symptoms, which are arguably a more serious adverse mental health outcome, began decreasing after several payments had been disbursed. In the secondary analysis in which we imputed missing values for income, the results were similar to findings for the main analysis, suggesting that complete case analysis omitting those with missing incomes did not contribute to bias (appendix exhibits A7 and A8).<sup>11</sup>

## Discussion

During the COVID-19 pandemic the CTC was temporarily expanded to millions of families for the first time, allowing twenty-seven million additional children from the most economically disadvantaged families to receive the full benefit amount.<sup>43</sup> Our study examined the effects of this

**EXHIBIT 1**

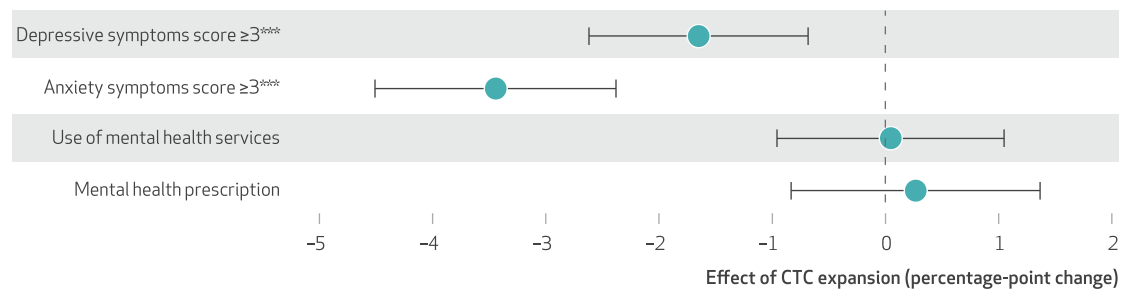
**Sample characteristics of respondents to the Household Pulse Survey, April 2021-January 2022**

Characteristics	Before July 15, 2021		After July 15, 2021	
	Adults with children (n = 112,862)	Adults without children (n = 237,901)	Adults with children (n = 145,429)	Adults without children (n = 316,122)
Age, mean years (SD)	44.8 (11.9)	57.3 (15.3)	44.0 (11.9)	56.1 (15.9)
Male, %	36.9	42.7	36.6	42.9
Married, %	70.7	53.9	69.9	52.7
Less than high school or high school education, %	13.1	11.9	13.2	12.2
Income, %				
Less than \$25,000	8.9	10.7	9.5	11.7
\$25,000–\$34,999	7.6	8.9	7.5	9.3
\$35,000–\$49,999	8.9	10.9	9.0	11.4
\$50,000–\$74,999	14.9	18.2	14.6	18.1
\$75,000–\$99,999	13.9	14.8	13.7	14.6
\$100,000–\$149,999	20.4	17.9	20.3	17.3
\$150,000–\$199,999	10.6	8.8	10.8	8.2
\$200,000 or more	14.8	9.8	14.5	9.5
Race and ethnicity, %				
White	68.9	79.3	68.6	78.9
Black	8.5	6.3	8.7	6.4
Asian	6.8	4.5	6.5	4.4
Hispanic	10.2	6.0	10.4	6.4
Other	5.7	3.9	5.8	3.9
Mental health outcomes				
Depressive symptoms score (continuous), mean (SD)	1.6 (1.8)	1.5 (1.8)	1.4 (1.8)	1.3 (1.7)
Depressive symptoms score ≥3, %	18.4	16.4	19.9	17.2
Anxiety symptoms score (continuous), mean (SD)	2.1 (2.0)	1.8 (1.9)	1.9 (2.0)	1.5 (1.9)
Anxiety symptoms score ≥3, %	25.5	20.1	29.3	21.6
Use of mental health services, %	21.8	16.5	23.3	18.4
Mental health prescription, %	23.6	22.4	24.6	23.9

**SOURCE** Authors' analysis of data from the Census Bureau's Household Pulse Survey, April 14, 2021–January 10, 2022. **NOTES** N = 812,314. Data were drawn from waves 28–41 of the Household Pulse Survey and included people with nonmissing information on the mental health outcomes of interest. July 15, 2021, is the date on which the first monthly expanded CTC payment was made, so it represents the transition from pre- to postpolicy data. Racial groups, including "other," are non-Hispanic. Depressive symptoms were captured using the Patient Health Questionnaire-2 scale, and anxiety symptoms were captured using the Generalized Anxiety Disorder-2 scale; both were dichotomized at the standard cutoff of 3 or more to indicate high risk of mental health problems. Full model results are in appendix exhibit A9 (see note 11 in text).

**EXHIBIT 2**

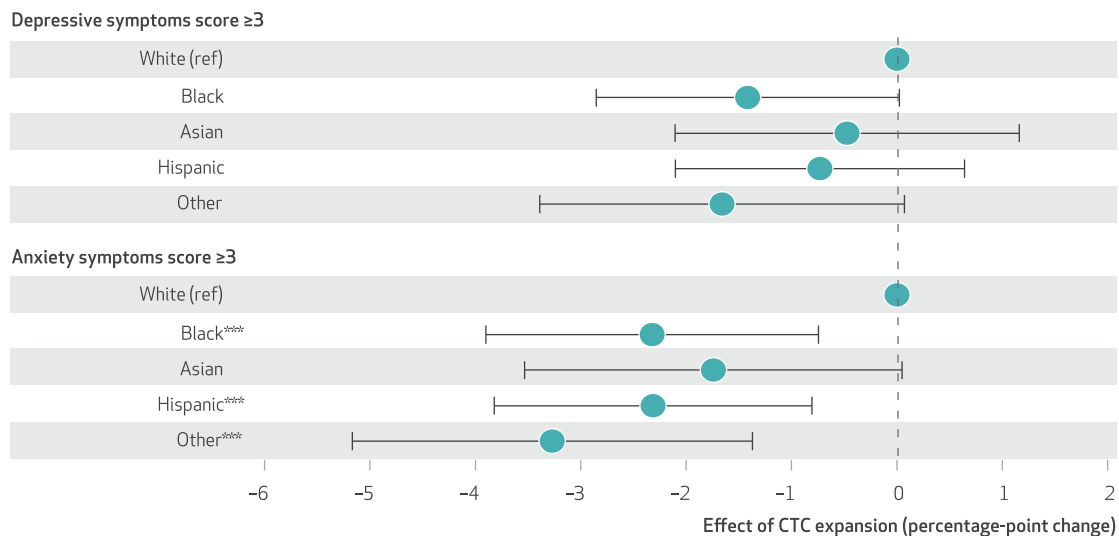
**Effects of the 2021 Child Tax Credit (CTC) expansion on mental health and mental health care use among low-income parents, April 2021-January 2022**



**SOURCE** Authors' analysis of data from the Census Bureau's Household Pulse Survey, April 14, 2021–January 10, 2022. **NOTES** Coefficients are plotted as point estimates with 95% confidence intervals (whiskers). Coefficients are derived from difference-in-differences models in which the primary exposure is a triple-interaction term between an indicator for whether the interview occurred after (versus before) the CTC expansion, a binary variable representing adults with (versus without) children, and a binary variable for whether the interviewee belonged to a lower-income (versus higher-income) group. All regressions adjusted for sex, race and ethnicity, income, marital status, number of children, and level of education, as well as fixed effects for biweekly waves. Depressive and anxiety symptoms scores are described in the exhibit 1 notes. \*\*\*p < 0.01

**EXHIBIT 3**

**Race and ethnicity differences in the effects of the 2021 Child Tax Credit (CTC) expansion on mental health among low-income parents, April 2021–January 2022**



**SOURCE** Authors' analysis of data from the Census Bureau's Household Pulse Survey, April 14, 2021–January 10, 2022. **NOTES** The methods behind this figure are described in the exhibit 2 notes. Depressive and anxiety symptoms scores are described in the exhibit 1 notes. Racial groups, including "other," are non-Hispanic. \*\*\* $p < 0.01$

increased income on mental health among adults with children, using a large serial cross-sectional national data set and rigorous quasi-experimental analyses. We found that the expanded CTC was associated with reduced anxiety symptoms among low-income adults with children, as well as greater mental health benefits among Black and Hispanic people than among White people. Previous studies have also shown a link between financial hardship and mental health.<sup>44,45</sup> In the overall sample and among each subgroup, there was no change in mental health care visits or prescriptions, suggesting that health care use was not the primary pathway explaining the results.

The reduction in the prevalence of clinically meaningful anxiety symptoms (-3.4 percentage points) represents a 13.3 percent reduction from baseline anxiety levels (25.5 percent) among adults with children. Although this may be a modest change in risk at the individual level, it represents a meaningful change in the distribution at the population level,<sup>46</sup> particularly considering the challenging pandemic-related circumstances during which it was implemented and the potential cumulative effects if the benefit were to be extended. The effect size is consistent with prior research finding that the other major US antipoverty program administered through the tax code—the EITC—also improves long-run mental health among recipients.<sup>23,47</sup> In fact, one prior paper found no short-term impacts of the

EITC on mental health;<sup>48</sup> it may be that the more regular payments of the expanded CTC were more effective in this respect. In addition, although receipt of some public benefits may lead to feelings of stigma that reduce participation or worsen mental health,<sup>49-51</sup> the expanded CTC benefit was nearly universal with few administrative burdens among those who received automatic benefits, perhaps allowing it to be more impactful for mental health.<sup>52</sup> These results contrast with those of one prior study that found no short-term effects of the CTC expansion on mental health, including among low-income families;<sup>53</sup> the latter used different measures of life satisfaction, depression, and anxiety; employed a different analytic technique; and had a smaller sample size than our study, which may explain the different findings.

We also found that the mental health benefits of the CTC expansion were largest among adults of Black, Hispanic, and other (non-Asian) racial and ethnic backgrounds. Of note, these groups stood the most to gain from the expanded CTC. During the COVID-19 pandemic, Black and Hispanic families reported higher rates of job loss—44 percent and 38 percent in October 2021, respectively—compared with 23 percent for White families, with similar disparities during earlier periods.<sup>54</sup> Because of historical and current structural racism and marginalization, these groups also have less wealth, and therefore less ability to withstand acute and chronic eco-

conomic adversity.<sup>8,31,55</sup> Hispanic families are also more likely to be ineligible for other safety-net policies because of immigration status, perhaps making the CTC a more salient program for them. For example, the federal EITC is only available to US citizens and permanent residents, whereas the CTC was available to families with mixed immigration status as long as the child had a Social Security number. In contrast, we found that Asian people benefited similarly to White people. Although Asian people overall are likely to be in a higher socioeconomic position than Black and Hispanic people, this may mask disparities within this heterogeneous group.

When examining one possible mechanism through which the increased income from the CTC may have improved mental health, we found no changes in mental health care use or prescriptions, suggesting that these were not the primary pathways explaining the reductions in depressive and anxiety symptoms, at least in the short term and in the context of altered patterns of health care use during the pandemic. However, recent studies using this data set and similar study designs have noted that the monthly CTC payments resulted in reductions in markers of financial hardship, with improved food sufficiency and more confidence in the ability to pay for housing.<sup>18,56</sup> This is consistent with prior studies that have also shown that food sufficiency and reduced financial hardship are associated with improved mental health.<sup>57-59</sup>

## Conclusion

The 2021 CTC expansion reduced child poverty by half, but its expiration caused millions of chil-

## The expanded CTC has the potential to improve the environments in which vulnerable low-income children grow up.

dren to fall back into poverty.<sup>19</sup> Our study adds to a small but growing body of work that shows that the CTC not only increased food sufficiency but also improved mental health among adults with children, particularly among the most marginalized groups. By reducing financial hardships, this policy has the potential to improve the environments in which vulnerable low-income children grow up. This study used a large serial cross-sectional diverse national data set and a rigorous quasi-experimental study design, providing timely evidence on a policy that is actively being debated by federal and state legislatures. These findings are important for Congress and state legislators to weigh as they consider making the CTC and other similar tax credits permanent to support economically disadvantaged families, particularly as the economic recovery from the pandemic drags on and as already marginalized families continue to be left behind. ■

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