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Impact of the United States federal child tax credit on childhood injuries and behavior problems☆

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Abstract

Children who grow up in poverty are at risk for various poor outcomes. Socioeconomic policies can shape the conditions in which families are raising children and may be effective at reducing financial strain and helping families obtain economic sufficiency, thereby reducing risk for poor health outcomes. This study used data from two surveys conducted in the US, the National Longitudinal Survey of Youth 1979 (NLSY79) and the NLSY79 Young Adult survey to determine whether the U.S. Federal Child Tax Credit (CTC), a socioeconomic policy that provides tax relief to low- and middle-income families to offset the costs of raising children, is associated with child well-being, as indicated by whether the child had injuries requiring medical attention and behavioral problems. Fixed-effects models, accounting for year and state of residence, detected a lower likelihood of injuries requiring medical attention (OR = 0.58, 95% CI [0.40, 0.86]) and significantly fewer behavior problems ($b = -2.07$, 95% CI [−4.06, −0.08]) among children with mothers eligible to receive a CTC, but only when it was partially refundable (i.e., mothers could receive a tax refund for a portion of the CTC that exceeds their tax liability) for families making as little as $3000 a year. Tax credits like the CTC have the potential to alleviate financial strain among families, and consequently, may have impacts on injury and behavior problems.

Keywords

Socioeconomic policies; Poverty; Child injury; Behavior problems

1. Introduction

Children who grow up in poverty are at significant risk for a variety of adverse outcomes (Chaudry & Wimer, 2016). Poverty directly influences children's well-being through limited

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CRediT authorship contribution statement

Whitney L. Rostad: Conceptualization, Methodology, Formal analysis, Writing - original draft. **Joanne Klevens:** Conceptualization, Methodology, Writing - original draft. **Katie A. Ports:** Writing - original draft. **Derek C. Ford:** Formal analysis, Writing - review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

access to quality health care, housing, and education; it also influences child well-being through its indirect effects on safety, stability, and parenting, as poverty is strongly related to child abuse and neglect (CAN) (Conrad & Byram, 2020; Walsh, McCartney, Smith, & Armour, 2019). CAN increases risk of unintentional injuries almost six-fold (Putnam-Hornstein, 2011). Indeed, many of the same risk factors that increase risk for CAN are also risk factors for unintentional injury (Peterson & Brown, 1994). In addition, children and adolescents from families living in poverty are at increased risk of developing behavioral problems, such as antisocial behavior, depression, and other externalizing and internalizing symptoms (Dearing, McCartney, & Taylor, 2006). The development of behavioral problems has been attributed to the adverse social environments in which families in poverty live that are characterized by instability (Edin & Shaefer, 2015; Newman & Chen, 2007), high levels of family stress and conflict, and low parental monitoring (Van Ryzin, Fishbein, & Biglan, 2018). Accordingly, instability (Evans & Wachs, 2010) and harsh, abusive, and neglectful parenting are consistently linked to children's behavioral problems later in life (Anda et al., 2006).

A growing body of evidence highlights the impact of moving into or out of poverty on children's risk for exposure to CAN (Cancian, Slack, & Yang, 2010; Slack, Lee, & Berger, 2007). For example, providing single mothers additional income through child support payments has been linked to reduced risk for CAN (Cancian et al., 2010). Conversely, a reduction in welfare benefits (i.e., income loss) has been associated with an increase in risk for reports to the child welfare system (Slack et al., 2007). When families experience a loss of income, they may experience material hardships such as utility shut-offs, food insecurity, and difficulty paying for housing, which can increase their risk of involvement with the child welfare system via neglect (i.e., failure to provide) and/or by increases in parental stress, a risk factor for abuse (Stith et al., 2009; Yang, 2015). Accordingly, ensuring that families have the necessary income support may reduce children's risk of CAN and other adversities.

Policies have the potential to shape the conditions in which families raise children and have greater reach than individual-level efforts (Frieden, 2010; Klevens, Barnett, Florence, & Moore, 2015; Putnam & Galea, 2008). Given the strong relationship between poverty and child well-being, socioeconomic policies may be effective at reducing financial strain, and consequently, risk for poor health outcomes (Glymour, Avendano, & Kawachi, 2014). Indeed, research links policies that increase families' household income (i.e., the Earned Income Tax Credit [EITC]) to various outcomes among children and families including: reductions in infant mortality (Arno, Sohler, Viola, & Schechter, 2009); reduced maternal stress (Evans & Garthwaite, 2012); fewer behavioral problems and injuries among children (Averett & Wang, 2016); reduced pediatric abusive head trauma (Klevens et al., 2017); and fewer foster care entries (Biehl & Hill, 2018). Other policies that increase household income might similarly promote child well-being by improving parents' ability to fulfill children's basic needs (e.g., food, shelter, medical care). Further, by reducing stress associated with financial insecurity and "freeing up bandwidth" (Mullainathan & Shafir, 2013) for parenting, parents may be more likely to engage in nurturing parenting behaviors, thereby promoting positive outcomes for their children.

The Child Tax Credit (CTC) is another socioeconomic policy with potential to improve household financial security and family and child well-being. The United States CTC, effective since 1998, provides tax relief to low and middle income families to offset the costs of raising children, which, in conjunction with the EITC, has been shown to lift millions of children out of poverty (Marr, Huang, Sherman, & DeBot, 2015). It is available to tax filers whose income falls below certain limits with qualifying children younger than 17 years. To be eligible for the full CTC, adjusted gross income (AGI) for married couples filing jointly cannot exceed US$110,000 and single tax filers cannot exceed US$75,000. As AGI increases above these limits, the amount of credit is reduced, until phased out completely (Tax Policy Center, n.d.). Initially the tax credit was nonrefundable (i.e., if tax filer's credit was greater than tax liability, filer only received the amount of tax liability), but the CTC was expanded in 2001 (effective 2002) when a refundable component was added as the Additional CTC—initially available to filers earning $10,000 or more; in 2009, it was made available to filers earning $3,000 or more. The Additional CTC allows eligible tax filers to receive a tax refund for a portion of the amount of the CTC that exceeds the amount of taxes owed by the tax filer (i.e., the "unused" amount of the CTC) (Internal Revenue Service, n.d.). If a family owes no taxes, they cannot claim the CTC (though they may be eligible to receive a refund through the Additional CTC), but if a family's tax liability is less than the CTC (i.e., they owe less in taxes than the amount of the CTC), a partial refund above the earning threshold (i.e., $3000) can be claimed through the Additional CTC. In its current form, the maximum credit per qualifying child is $1000. The Tax Cuts and Jobs Act, effective in 2018, increased the maximum CTC to $2000 per child and up to $1400 of the CTC will be refundable (Tax Cuts and Jobs Act, Dec. 22, 2017). Several states have also adopted state-level CTCs to supplement the federal CTC (i.e., California, Colorado, Idaho, New York, North Carolina, and Oklahoma) that vary in eligibility criteria, funding amounts, and whether they are refundable (Tax Credits for Workers and their Families, n.d.).

Simulations of potential child allowance policies estimated that a $1000 per child allowance, paid to each family regardless of income or tax status, could reduce child poverty in the U.S. from 26.3% to 23.2% (Pressman, 2011). Increasing the allowance to $4000 could reduce child poverty to 14.8%, which could save the U.S. nearly $250 billion in costs related to lost productivity, healthcare, and crime by reducing the number of children in poverty (Pressman, 2011). A study exploiting variation in child benefits across Canadian provinces demonstrated that increased CTCs were associated with reductions in children's hyperactivity-inattention, physical aggression, and emotional disorder/anxiety scores, as well as reductions in maternal depression (Milligan & Stabile, 2011), all of which are risk factors for CAN (Stith et al., 2009).

No research, to our knowledge, has examined the effectiveness of the US CTC to improve the well-being of children in eligible families. To fill this gap, this study used data from a longitudinal study with a nationally representative sample of mothers and their biological children to examine the influence of the federal CTC on child well-being. We hypothesized that changes in the CTC (i.e., when the policy was initiated [1998], when it became refundable [2002–2008], and when the refund threshold was lowered [2009–2014]) would be associated with reductions in children's injuries requiring medical attention, a potential indicator of CAN (Putnam-Hornstein, 2012) as well as unintentional injuries, and fewer

behavior problems, a risk factor for CAN (Stith et al., 2009) and youth violence (Lipsey & Derzon, 1998).

2. Method

2.1. Data

The data for this study are from the National Longitudinal Survey of Youth (NLSY79) and the NLSY79 Child Survey (Bureau of Labor Statistics & U.S. Department of Labor, 2016). The NLSY79 has followed a cohort of youth born between 1957 and 1964 since 1979. The original cohort included a nationally representative sample of 12,686 participants who were between 14 and 22 years old at the time of their first interview in 1979. Participants were surveyed every year from 1979 to 1994 and every other year from 1994 through 2014. The survey includes extensive information regarding demographics, employment, education, and family experiences. Marital status, income, number of children, and children's ages were used to determine whether participants would have qualified for a CTC. Specifically, married mothers who reported a household income of $110,000 or less and had at least one child 17 years and younger, and single mothers who reported a household income of $75,000 or less and had a child 17 years and younger were deemed eligible for the federal CTC.

The NLSY79 Child Survey follows the biological children of the women included in the NLSY79 (Bureau of Labor Statistics & U.S. Department of Labor, 2016). Children in the NLSY79 Child Survey were born between 1970 and 2014, and were first surveyed in 1986. As of 2014, 11,521 children (51% male; 53% white) were born to NLSY79 mothers. The NLSY79 Child Survey collects information regarding health, including injuries and behavior problems, and assesses all children born to NLSY79 females on aspects of development. In the current study, children were matched with their biological mothers in the NLSY79 to examine the effects of the federal CTC on child well-being (only children under 18 years at the time of the survey were included). Across years, response rates for the NLSY79 and completion rates for the NLSY79 Child Survey were consistently over 75%.

Our dependent variables included a binary variable of whether or not the child had an injury requiring medical attention in the past year and the Behavior Problems Index (BPI) standardized z score (Peterson & Zill, 1986). Both are reported by the mother. The BPI is a 28-item scale that assesses the internalizing (e.g., anxiety) and externalizing (e.g., hyperactivity) behavioral problems of children ages 4–17, and one of the mostly widely used assessments of the NLSY79 Child Survey (Peterson & Zill, 1986). Higher scores reflect greater behavioral problems. Across all years, total scores for the BPI ranged from 72 to 149 with a mean score of 105 (SD = 15.02) and 10.38% of children suffered any injury requiring medical attention in the year prior to the survey (see Table 1 for breakdown across policy levels).

2.2. Data analysis

Using a longitudinal data set (which includes mothers with multiple children assessed across several time points), we conducted fixed-effects regression models with year and state

specified as fixed effects, to determine whether mothers' access to a federal CTC influenced children's health and well-being. To do so, we exploited policy changes in 1998 when the CTC was introduced, 2002 when it became refundable for families with incomes greater than $10,000 (i.e., tax filers making more than $10,000 get money in excess of their tax liability), and 2009 when it reduced the threshold for families' eligibility for a refund to $3000. Our independent variable, the federal CTC, was coded '0′ for years prior to its introduction in 1997 and if a mother did not qualify. Thus, the models estimated effects for the years 1998–2001, 2002–2008, and 2009–2014 to examine the effects of access to a non-refundable CTC and partially refundable CTC for those earning $10,000 or more and then for those earning $3000 or more compared to no CTC (reference group). Logistic regression was employed for the binary variable of injuries requiring medical attention, while ordinary least squares was used for the standardized BPI outcome. Models controlled for the following covariates: maternal education, number of weeks mothers were unemployed in the past year, household income, number of children in the household, child sex, and child age.

The regression models with fixed effects take the form:

$$Outcome_{ijt} = \alpha + CTC_{jt}\beta + \boldsymbol{X}_{ijt}\beta + State_{jt} + Year_t + \varepsilon_{ijt} \quad (1)$$

where i indicates child, j indicates mother, and t indicates year. $Outcome_{ijt}$ is one of the indicators of child well-being, CTC_{jt} refers to a set of dummy-coded variables representing our independent variable, and $\boldsymbol{X}_{ijt}$ is a vector of child and maternal characteristics used as controls. $State_{it}$ refers to a set of state dummy-coded variables, which allows us to adjust for variation in levels of benefit of public assistance support programs, adoption of state-level CTCs, and other time-invariant differences across states not explicitly measured in the data. Year fixed effects and an error term are also included. We used regression with fixed effects as well as robust standard errors adjusted for children clustering within mothers' identification number (i.e., mothers with multiple surveyed children), which controls for all family characteristics that do not change over time that may affect child outcomes. These are robust to potential heteroscedasticity and serial correlation in the error term within panels (i.e., mothers). Analyses were conducted using Stata 14, which employs listwise deletion (StataCorp, 2015).

3. Results

Regression models, controlling for year and state fixed effects and demographic covariates, revealed significant effects of the CTC on outcomes, but only for the 2009 expansion, when the CTC became partially refundable for families earning as little as $3000 (see Table 2). The non-refundable CTC between 1998 and 2001 was marginally related to a reduction in injuries (Odds Ratio = 0.76, 95% CI [0.56,1.02], z = −1.84); the partially refundable CTC between 2002 and 2008 did not have statistically significant effects on any of the examined outcomes. The 2009 CTC expansion was significantly related to injuries (OR = 0.58, 95% CI [0.40, 0.86], z = −2.76) and the BPI (b = −2.07, 95% CI [−4.06, −0.08], t = −2.04). Specifically, children with mothers who were eligible for the partially refundable federal CTC under the 2009 expansion—which reduced the earning threshold to qualify for a refund

from $10,000 to $3000—were less likely to have any injuries requiring medical attention and had fewer internalizing and externalizing behavior problems.

4. Discussion

Using data from a longitudinal study with a nationally representative sample of mothers and their biological children, results from this study suggest that the federal CTC is associated with child well-being. Specifically, fewer injuries requiring medical attention and fewer behavior problems—a potential indicator of CAN and risk factor for both CAN and youth violence (Lipsey & Derzon, 1998; Putnam-Hornstein, 2012; Stith et al., 2009)—were observed among children with qualifying mothers, but only when the CTC was partially refundable for lower income families making as little as $3000 a year. Previous simulations showed reductions in child poverty when all families receive a child allowance regardless of income or tax status (Pressman, 2011). This suggests that effects of the CTC might be greater if extended to families who earn less than $3000. Increasing the amount of the CTC that is refundable so that families receive more cash support might help them obtain greater economic self-sufficiency, consistent with research that suggests that increasing the generosity of EITCs enhances the likelihood that families transition out of poverty (Neumark & Wascher, 2000).

The present study demonstrates that the CTC is significantly related to children's injuries or behavior problems when the partial refund is extended to families making less than $10,000. Consequently, extending the CTC to families most in need of income support may have reduced financial strain and contributed indirectly to fewer child injuries and behavior problems. Indeed, previous research demonstrated that a change in the family income-to-needs ratio (i.e., family income divided by poverty threshold for corresponding family size) was strongly related to outcomes (e.g., language development, school readiness) for children from poor families, but less so for families living above the poverty threshold (Dearing, McCartney, & Taylor, 2001). Perhaps more saliently, children from poor families who experienced increases in income-to-needs had similar outcomes to children from families not in poverty.

There may be several reasons why the non-refundable CTC introduced in 1997 and partially refundable CTC in 2002–2008 were not significantly related to positive outcomes among children in this study. The findings may reflect that earlier forms of the CTC may not have reached enough children, and the amount allocated through a partial refund may not have been sufficient to make a difference for child well-being. Furthermore, a non-refundable CTC or one that is partially refundable for those earning $10,000 or more may not have benefitted the families who needed it most – the very low-income and those without any tax liability. Research suggests that children from families living below the poverty threshold would benefit most from income support, as increases in family income-to-needs can have a large impact on outcomes for children living in poverty but to a lesser extent for higher income children (Dearing et al., 2001). Thus, increasing a poor family's financial resources to fulfill basic needs may alleviate the financial strain of economic insecurity, thereby improving family well-being and parents' ability to engage in nurturing and supportive parenting behaviors.

Comparisons with other high-income countries suggest that the U.S. has higher poverty rates, and as a result, poorer health and educational outcomes are observed among its children (Smeeding & Thevenot, 2016). In 2012, the child poverty rate was 20% in the U.S., compared to Norway at 5%. Contributors to Norway's low rate include policies such as strong parental work aids and income support for children, and universal subsidized child care and family leave (Smeeding & Thevenot, 2016). Smeeding and Thevenot posit that these policies could reduce child poverty and improve children's health outcomes if implemented in other similar nations (Edelman, 2016; Smeeding & Thevenot, 2016). The 2018 tax reform may help improve children's health and life outcomes as it doubled the maximum credit amount per family and also made more of the credit refundable. Future research will need to examine whether the CTC expansion under the 2018 tax reform will expand and improve outcomes among poor and low-income children, and whether it does to a greater extent than previous versions of the tax credit.

Findings should be considered in the context of study limitations. First, the NLSY79 data does not lend itself to determining whether mothers eligible to receive a federal CTC actually received the tax credit. Further, because of the nature of the NLSY79 sample, the age of the child sample has shifted from a mostly younger child sample in early survey years to an increasingly young adult population in more recent survey years, as evidenced by only 276 children receiving the 2014 child survey (see https://www.nlsinfo.org/content/cohorts/nlsy79-children/intro-to-the-sample/sample-design). Thus, the number of mothers eligible to receive a CTC has also changed over the years, given that children 17 years and older are no longer a qualifying child; as a result, the number of mothers eligible to receive a CTC in later years (particularly 2010–2014) was significantly reduced. Moreover, children born in the early years of the survey were primarily born to very young mothers, and are much more likely than children born in later rounds to be economically disadvantaged. Consequently, the effects of the CTC detected in the current study may be conservative estimates of the actual effect of the CTC on children's injuries and behavioral problems.

We also did not consider the value of the CTC that mothers were eligible to receive. Future research using data that indicates whether mothers actually received a CTC and the value of the credit and refund is needed to examine its potential to improve children's outcomes. Additionally, the outcomes used in the current paper were reported by the mother and could be subject to underreporting. Finally, several states have also enacted their own state-level CTCs to supplement the national CTC (i.e., California, Colorado, Idaho, New York, North Carolina, and Oklahoma), which vary in time of adoption, eligibility criteria, funding amounts, and whether they are refundable (Tax Credits for Workers and their Families, n.d.). The combination of the national and state-level CTCs may be more effective at improving outcomes among children than either tax credit alone; future research examining state-level CTCs is needed to elucidate the impact of state-level tax credits.

Despite limitations, this research provides insight into the complex association between child well-being, poverty, and strategies that attempt to lift children and families out of poverty. Findings from this study are consistent with other research demonstrating that improving the socioeconomic conditions of families by strengthening economic supports can help ensure safe, stable, nurturing relationships and environments for children and families,

and in turn, promote child well-being and health (Arno et al., 2009; Averett & Wang, 2016; Evans & Wachs, 2010; Klevens et al., 2017). Economic supports, such as the CTC, have potential to alleviate financial strain among families, and consequently, may have far-reaching impacts on population health and well-being (Glymour et al., 2014). Still, financial enrichment alone may not be sufficient to mitigate some issues (e.g., child behavior problems) and evidence-based programs that focus on improving parent-child relationship quality and behavior management skills may also be needed (Van Ryzin et al., 2018). The magnitude and burden of child poverty and sequela of adverse outcomes warrants additional exploration of policies and practices that promote child well-being, which may include socioeconomic policies like the CTC, as part of a comprehensive strategy for decision-makers seeking to reduce poverty and its deleterious effects on the health and prosperity of people and communities. Future analyses may uncover important aspects of the policy's implementation that can elucidate the CTC's impact on children's exposure to CAN, youth violence, and other poverty-related adversities, which could guide how states and communities consider and decide to implement this or similar policies to promote health and well-being for everyone.

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Table 1

Descriptive statistics for outcome and control variables by Child Tax Credit Status, 1986–2014.

	Mean	Standard Deviation	Observations
No *Child Tax Credit (prior to 1997)*			
Behavior problems[a]	106.33	14.84	25,231
Injuries (% any injuries)	10.62	–	37,263
Child age	7.93	4.79	56,435
Child sex (% male)	51.12	–	56,431
Maternal education (% high school education)	79.82	–	47,449
Weeks of maternal unemployment	2.30	7.20	46,363
Reported children in household	2.40	1.23	47,536
Annual Household Income	$49,884	$87,909	40,374
Non-Refundable Child Tax Credit (1998–2001)			
Behavior problems[a]	103.75	15.18	4,973
Injuries (% any injuries)	9.93	–	6,377
Child age	10.20	4.59	9,550
Child sex (% male)	50.65	–	9,550
Maternal education (% high school education)	87.52	–	9,550
Weeks of maternal unemployment	1.81	7.34	9,517
Reported children in household	2.80	1.36	9,550
Annual Household Income	$40,290	$27,967	9,550
Partially Refundable Child Tax Credit (2002–2008; $10,000 Refundability Threshold)			
Behavior problems[a]	102.13	14.96	5,653
Injuries (% any injuries)	10.24	–	6,144
Child age	11.68	4.01	9,631
Child sex (% male)	51.62	–	9,631
Maternal education (% high school education)	89.38	–	9,631
Weeks of maternal unemployment	2.25	8.68	9,417
Reported children in household	3.13	1.64	9,622
Annual Household Income	$47,342	$30,768	9,631
Child Tax Credit (2009–2014; $3,000 Refundability Threshold)			
Behavior problems[a]	100.83	14.98	944
Injuries (% any injuries)	8.46	–	957
Child age	13.34	2.91	1,802
Child sex (% male)	49.50	–	1,802
Maternal education (% high school education)	88.35	–	1,802
Weeks of maternal unemployment	2.48	9.28	1,778
Reported children in household	3.32	1.84	1,798
Annual Household Income	$46,708	$31,227	1,802

[a]Mothers were only asked about behavioral problems for children four and over. Reported numbers represent Z-scores.

Table 2

Fixed effects models predicting injuries requiring medical attention and behavior problems, NLSY79 child survey 1986–2014.

Variables	**Outcomes**[a]					
	Injuries			**Behavior Problems**		
	OR	**SE**[b]	**z**	***b***	**SE**[b]	**t**
No CTC (prior to 1997)	Ref			Ref		
CTC (Non-refundable; 1998–2001)	0.76	0.11	−1.84	−0.86	0.72	−1.19
CTC ($10,000 Refundability Threshold; 2002–2008)	0.90	0.09	−0.98	−0.18	0.54	−0.33
CTC ($3,000 Refundability Threshold; 2009–2014)	**0.58**	**0.11**	**−2.76****	**−2.07**	**1.01**	**−2.04***
Child age	**1.05**	**0.005**	**11.42*****	**0.58**	**0.03**	**16.87*****
Child sex[c]	**0.66**	**0.02**	**−11.95*****	**−2.51**	**0.23**	**−10.74*****
Maternal education	**1.03**	**0.01**	**2.89****	0.02	0.22	0.10
Weeks of unemployment	1.00	0.002	−0.88	0.004	0.01	0.33
Income[d]	1.00	0.0002	−0.24	**−0.004**	**0.002**	**−2.60****
Reported children in household	**0.90**	**0.02**	**−5.55*****	0.14	0.22	0.53
***R*²**	0.02			0.04		
# of Clusters (Mothers)	4,357			4,119		
# **of Observations**	43,801			32,191		

Note. CTC = Child Tax Credit. OR = Odds Ratio.

[a] All models controlled for year and state fixed effects.

[b] Robust standard error, clustered for mother ID.

[c] 1 = Male, 2 = Female.

[d] per $1000.

* p < .05.

** p < .01.

*** p < .001.