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Associations Between Economic Conditions and Mental Health Among Farm Parents

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ABSTRACT

Introduction: Agricultural producers in the United States experience chronic economic volatility that may place them at elevated risk for mental health challenges and disrupted family functioning. Guided by the Family Stress Model (FSM), this study examined associations between economic hardship, mental health, and parenting style among U.S. farm parents.

Methods: Data were drawn from a cross-sectional survey conducted in 2021 and 2022 with 298 farm adults across multiple states. The survey included validated measures of financial strain, symptoms of depression and anxiety (PHQ-9, GAD-7), and parenting style, categorised into authoritative, authoritarian, permissive, or uninvolved.

Results: Results revealed that 40.7% of farm parents met the threshold for probable depression and 30.6% for probable anxiety – rates substantially higher than national averages. Financial indicators such as difficulty paying bills, unmet material needs, financial cutbacks, and higher debt-to-asset ratios were significantly associated with poorer mental health outcomes. Parenting style was also related to both economic stress and emotional well-being: authoritative parents reported the lowest financial stress and mental health symptoms, while uninvolved parents reported the highest.

Conclusions: These findings are consistent with FSM pathways, which posit that economic hardship is associated with greater psychological distress and disruptions in parenting behaviors.

KEYWORDS

Agriculture; mental health; parenting; stress

Introduction

Agricultural producers face unique occupational stressors, with financial and economic pressures consistently ranked among the most significant.^{1–3}

Since 2020, agricultural producers in the United States (U.S.) have faced increasingly unpredictable and overwhelming economic conditions.^{4,5} The Coronavirus (COVID-19) pandemic disrupted the U.S. farm economy, affecting both production and household stability. Businesses experienced disruptions to production due to limited availability of labor, limited availability of input products, and changing demands for commodities, which resulted in fluctuating and unpredictable prices.⁶ Since 2022, net farm income has declined significantly due to falling commodity prices and a sharp reduction in direct government payments – now at their lowest level since 2014, following a peak in 2020.

Given the centrality of financial viability to agricultural production, the economic realities of

farming and ranching have potential consequences on the social well-being and mental health of farm families. Farmers reporting higher financial stress also report more symptoms of anxiety and depression,⁷ which are among the most common mental health conditions in the U.S.^{8,9} Agricultural producers consistently experience these symptoms at higher rates than the general population.^{7,10,11} Left untreated, anxiety, and depression reduce quality of life, strain relationships, and increase risks of substance use, chronic health conditions, and suicidal ideation.^{12–14} However, few studies have examined how specific economic stressors – such as income volatility and increasing operational costs – relate to mental health outcomes in this population.

To further add to agricultural producers' stress, many are also parents. A robust body of research demonstrates that financial strain within families can influence parenting practices. Additionally, parent mental health may also influence parenting

practices. Specifically, poor mental health in parents has been associated with family disharmony and maladaptive parenting practices.^{15,16}

There are four distinct parenting styles: authoritative, authoritarian, permissive, and uninvolved, based on varying levels of parental involvement and control.^{17,18} Authoritative parents, characterized by high involvement and control, are reasonable, nurturing, and frequently engage with their children.¹⁷ Authoritarian parents, characterized by low involvement and high control, have strict disciplinary style, are inflexible, and frequently use punishment and one-way communication with their child.¹⁷ Permissive parents, characterized by high involvement but low control, employ a lax parenting style, do not enforce boundaries or rules, and provide limited guidance to their child. Uninvolved parents, characterized by low involvement and low control, are neither demanding nor responsive to the needs of their child.¹⁷ While these categories remain widely used, recent work highlights that parenting is not static but rather a set of practices that can shift depending on context.¹⁹ For example, during periods of acute financial hardship, a parent who is generally authoritative may temporarily withdraw or become less responsive, resembling an uninvolved style. Such shifts matter, because parenting practices influence mental health in multiple directions: warm and responsive parenting is associated with fewer internalizing and externalizing problems in children, while negative interactions contribute to poorer outcomes.²⁰ The demands of parenting can also affect parents' own mental health, particularly when resources are limited. Building on this, empirical studies have found that parents experiencing greater financial stress are more likely to report negative parenting practices compared to those under less stress.^{21–23} Elevated stress has also been linked to increased parent – child conflict and the use of harsh disciplinary practices,²³ both of which may contribute to adverse child emotional and behavioral outcomes. Furthermore, symptoms of poor parental mental health, such as anxiety and depression, may intensify these patterns, limiting parents' emotional and cognitive resources for effective parenting. There is limited research into farm parents' parenting styles; however,

authoritarian and uninvolved parenting has been associated with child agricultural injury.²⁴

Despite increasing recognition of stress and parenting challenges within rural and agricultural communities, little is known about how financial hardship specifically is associated with both symptoms of mental health conditions and parenting behaviors among farm parents. This study seeks to address this gap by examining the associations between farm-specific stressors, economic hardship, mental health, and parenting style among adult agricultural producers in the United States. The analysis is guided by the Family Stress Model,²⁵ which provides a framework for understanding how economic pressure may influence family dynamics and parenting behaviors.

Theoretical framework: family stress model

The family stress model (FSM) outlines specific processes through which economic hardship is expected to impact family functioning development by way of family disruptions, relationships, and parenting. Originally conceptualized by Conger et al. (1994), the FSM was first tested among farm and rural families in the U.S. Midwest during the economic downturn known as the 1980s Farm Crisis.²⁵

According to the FSM, economic hardship – typically defined as exposure to negative economic events and persistently low family income – leads to increased economic pressure experienced by adults in the household. Negative economic events may include job-loss, home foreclosure, forced sale of land, and alike. Economic pressure, in turn, reflects the lived consequences of these hardships, including the need to cut back on essential goods and services, reduce daily expenditures, or forgoing bills.

The FSM proposes economic pressure will increase emotional distress among parents, including symptoms of psychological distress, which will then disrupt the functioning of their relationship and intensify conflict in the relationship. Interparental conflict then disrupts effective parenting and strains the child-parent relationship and poor parenting will predict child emotional and behavioral problems.^{25–27}

The FSM has been applied to various populations to examine the relationship between

economic pressure, parental emotional and behavioral problems, and adolescent externalizing and internalizing behaviors.^{25–29}

Materials and methods

This cross-sectional study was conducted among agricultural producers in two panels: summer 2021 and summer 2022. All study procedures were reviewed and approved by the Institutional Review Board at the University of Illinois Urbana-Champaign (project title: Farm Adolescent and Adult Mental Health (FAAM), protocol number: 21,759).

The target population included parents and adolescents residing on farms and actively engaged in agricultural production in the U.S. Initially, recruitment efforts were focused on five midwestern States – Illinois, Iowa, Wisconsin, Minnesota, and Indiana – due to their agricultural productivity, high proportion of full-time producers, and prevalence of on-farm residency among primary operators.³⁰ During the recruitment period, the target population was expanded to include farm and ranch families nationwide.

Recruitment

Two primary recruitment strategies were used. First, a list of 1,000 agricultural producers with at least one adolescent in the household was purchased from Farm Market iD (now U.S. Farm Data). FMiD/U.S. Farm Data maintains a list of farm owners and operators based on the same sources as the U.S. Department of Agriculture's (USDA) databases and estimates 95% coverage of farm owners and operators. To identify eligible participants, USDA agricultural census data were overlaid with consumer records to select producers who: (1) work full-time on the farm, (2) live on the farm they operate, and (3) have at least one adolescent aged 13–17 in the household (Farm Market iD, 2020).

In 2021, recruitment materials were sent via mail using a modified Dillman approach to encourage survey response.³¹ Dillman encourages unique, repeated contacts with potential participants.³¹ An introductory postcard to pique interest was sent to each address. Then,

3 weeks later, a letter was sent that included the objectives of the study, IRB information, directions for participating, and a QR code to the online surveys. Approximately 3 weeks later, a reminder postcard was sent that included the QR code to the online surveys. In the second year (2022), a postcard was mailed to 1,000 different agricultural producers. The postcard included a brief introduction to the project, a QR code to the online survey, a website link for more information about the study, and contact information for the project director.

In both years, online recruitment also occurred. The project team partnered with Extension, commodity groups, and farm organizations to disseminate information about the study via email, newsletters, and social media. These messages directed potential participants to a study website that provided an overview of the research, IRB details, instructions for participation, and a link to the online surveys. To distinguish participants by recruitment method, two duplicate online surveys were created each year—one linked to the mailed materials and one shared through online and organizational channels. Each survey had a unique web address for tracking purposes.

Procedures

Surveys were administered using Research Electronic Data Capture (REDCap) at the University of Illinois. REDCap is a highly sophisticated, secure, web-based application designed to support data capture for research studies.³² The project team worked with REDCap administrators to develop a series of consent forms and assent forms in addition to the online surveys, to ensure protection of participants.

A QR code included on recruitment materials (e.g., letters, emails, and social media posts) directed potential participants to an online parent/adult consent form. The primary consenting adult (P1) provided their name, email address, and electronic signature. This form also requested consent for an adolescent in the household to participate and asked for the adolescent's name and email address. Additionally, if a second adult (P2) was present in the household, the form provided an optional field to enter their name and email.

After completing the consent process and providing contact information for other household members (as applicable), the primary adult was directed to begin the P1 online survey. REDCap automatically emailed the adolescent a link to their assent form, which had to be completed before their survey was accessible. Similarly, if a second adult was listed, REDCap sent them a link to their consent form and, upon completion, to their own survey (P2). All family members' consent, assent, and survey data were linked within REDCap. Each participant who completed a survey received a \$10 Amazon e-gift card.

Materials

Online surveys were administered to collect information about farm economics, family dynamics, and mental health from farm parents and adolescents. The present report focuses on measures from the adult survey, completed by at least one adult per household. The adult survey, which could be accessed via smartphone, tablet, or computer, required an average of 31 minutes to complete (median = 21.5 minutes). The survey could be completed on a smartphone, tablet, or computer. The adult survey included the following sections and questions and/or instruments:

Screening

Eligibility was determined via screening questions. Adults had to identify as one of the following (1) primary operator or principal operator of a farm, ranch, or agricultural operation, (2) partner or spouse of the primary operator or principal operator of a farm, ranch, or agricultural operation, or (3) none of the above. Adults were also asked whether they reside, at least 50% of the time, on the farm, ranch, or agricultural operation and if they had an adolescent between the ages of 13 and 17 in their household. To proceed to the remainder of the survey, adults must have identified as either the primary operator or partner/spouse of the primary operator, reside on the farm/ranch/agricultural operation at least 50% of the time, and have an adolescent between the ages of 13 and 17 in the household at least 50% of the time.

Demographic and farm characteristics

Adults responded to items related to the following variables: state of residency, age, gender, ethnicity, race, education, material status, number of children had, age range of children, number of children in the household, military status, employment status, number of years farming, primary farm commodity, secondary farm commodity, annual farm/ranch net sales, and residential environment.

Economic hardship

Adult respondents completed five subscales adopted from the economic pressure measures developed by Conger et al.²⁵: (1) make ends meet, (2) material needs, (3) cutbacks/adjustments, (4) negative financial events, and (5) financial stress. The first subscale included two items indicating whether parents believed they could "make ends meet" during the past 12 months. The first item asked, "During the past 12 months, how much difficulty have you had paying your bills?" Response options and corresponding value were a 4 = great deal of difficulty, 3 = some difficulty, 2 = a little difficulty, and 1 = no difficulty at all.

The second item was, "Think again over the last 12 months, generally, at the end of the month, do you end up with ... " and response options and corresponding values were more than enough money left over = 1, some money left over = 2, just enough to make ends meet = 3, and not enough to make ends meet = 4. Higher values indicate more financial difficulty and more difficulty making financial ends meet.

The second subscale measured whether the household could meet its basic material needs. Adults responded to six statements about basic material needs (clothing, transportation, a home, furniture and household appliances, food, and medical services). Responses options and corresponding values were 1 = yes, 0 = no, and averaged to create a subscale score with a permissible range from 0–1. Higher scores indicate more unmet needs.

The third subscale assessed whether the family had made significant financial cutbacks in 29 areas, including food, medical care, and utilities, because of economic hardship. Responses were dichotomously scored (1 = yes, 0 = no) and

averaged to create a subscale score with a permissible range from 0 to 1. Higher scores indicate more financial cutbacks.

The fourth subscale, negative financial events, assessed aversive changes in economic circumstances during the past year, including reduction in wages, being fired, or laid off, and suffering a financial loss in business. Adults indicated whether 27 negative financial events had occurred in the past 12 months. Responses were dichotomously scored (1 = yes, 0 = no) and averaged to form an index of undesirable financial events over the past 12 months with a permissible range from 0 to 1. Higher scores indicate more negative financial events.

The final subscale assessed financial stress. Adult responded to five statements about financial stress including whether they have trouble sleeping because of financial problems, concern around affording health insurance, and whether their financial situation is much worse than it was in the previous 12 months. Response options and corresponding values were strongly 5 = strongly agree, 4 = agree, 3 = neutral/mixed, 2 = disagree, and 1 = strongly disagree. Response values were averaged across the 5 items to create a mean score with a permissible range from 1 to 5. Higher mean scores indicate more financial stress.

Debt to asset ratio was calculated by dividing the reported debt by the reported assets of each respondent. Respondents were asked to estimate their farms debt load at the end of the previous year. Respondents were also asked to estimate the value of their farm assets at the end of the previous year.

Agricultural stress

A modified 41-item Farm Stress Survey³³ was used to assess seven domains of farm-related stress: personal finances, time pressure, climate conditions, geographic isolation, hazardous work, general economic conditions, and interpersonal relationships. Participants indicated the extent to which each of the items of the Farm Stress Survey was a source of worry or concern in the past 2 weeks on a five-point Likert-type scale (1 = not at all, 5 = a great deal). *Farm Stress Survey* subscale scores were calculated by determining the mean response to the items within each subscale.

Permissible subscale scores range from 1 to 5 with higher scores indicating greater perceived concern.

Health

Respondents reported on chronic health conditions (e.g., asthma, arthritis, anxiety, cancer, chronic obstructive pulmonary disease, dementia and/or Alzheimer's disease, depression, diabetes, hearing loss, heart condition, high blood pressure, high cholesterol), body metrics (height and weight), and average hours of sleep per night.

Mental health

The Generalized Anxiety Disorder-7 item scale (GAD-7) was employed to identify self-reported symptoms of anxiety among adults. Participants responded to seven unique statements that queried the frequency of anxiety-related symptoms experienced in the past 2 weeks (e.g., not being able to stop or control worrying). Response options were assigned a point-value; not at all = 0, several days = 1, over half the days = 2, nearly every day = 3, and summed across the seven unique anxiety-related symptoms for an individual's total score. The possible score range is 0–21. Scores of 0–4 indicate none or minimal anxiety, scores of 5–9 indicate mild anxiety, 10–14 moderate anxiety, and 15–21 severe anxiety.³⁴ A GAD-7 score ≥ 10 is indicative of probable anxiety. This seven-item questionnaire has been widely used in population-based survey studies³⁴ and among farm populations^{7,35} and has high internal validity ($\alpha = 0.81$), sensitivity (89%), and specificity (82%).³⁴

The Patient Health Questionnaire-9 item scale (PHQ-9) was used to assess self-reported symptoms of depression among adults. Participants responded to the nine statements that inquired about the frequency of depressive symptoms experienced in the past 2 weeks (i.e., poor appetite or overeating, feeling tired or having little energy). Response options were assigned a point-value; not at all = 0, several days = 1, over half the days = 2, nearly every day = 3, and summed across the nine unique depression-related symptoms for an individual's total PHQ-9 score. The possible score range is 0–27. Cut off points are: 0–4 is none or minimal depressive symptoms; 5–9 is considered minimal depressive symptoms; 10–14 is

considered major depression, mild severity; 15–19 is considered major depression, moderate severity; and 20 or higher is considered major depression, severe severity.³⁶ A PHQ-9 score ≥ 10 is indicative of probable depression.³⁷ The 9-item questionnaire has been used to estimate the prevalence of depression among the general U.S. population³⁶ and farmers^{7,35} and demonstrates high internal validity ($\alpha = 0.91$), sensitivity (88%), and specificity (89%).³⁶

Parenting style

Parenting involvement and control were assessed using a modified version of the Steinberg instrument,¹⁸ a 15-item instrument that includes nine items related to involvement and six items related to control. Adults responded to each item indicating how much they agree with each item on a five-point Likert scale strongly (1 = strongly disagree, 5 = strongly agree). A control and involvement score were calculated for each adult by summing the values of each response. Control and involvement scores were dichotomized at their median values to identify high and low control and involvement categories.¹⁸ The combinations of the dichotomized involvement and control scores were used to categorize participants into one of four parenting styles: authoritative (high on involvement and high on control), authoritarian (low on involvement and high on control), permissive (high on involvement and low on control), and uninvolved (low on involvement and low on control).

Data analysis

In the final analysis cohort of 298 farm parents, relatively few response items were missing. For mental health scales, financial stress subscales, agricultural stress subscales, and parenting style dimensions, 0.3% of items were missing. For example, six individuals skipped one item when completing the GAD-7. To allow for some missed items, whenever over half of the items were completed, the mean of the completed items was scaled to the same range as the summary score.

Descriptive summaries characterize the study cohort using standard descriptive statistics. Statistical comparisons were made using the non-parametric Kruskal-Wallis test for continuous data

and Chi-squared tests for categorical data. The results in this report were deemed statistically significant at the 5% level ($p < .05$) without adjustment for multiple comparisons. Sample sizes may vary across analyses due to missing data or skipped responses by participants. All questions were voluntary.

Data collection of 2 years resulted in 6,157 respondents. Recruitment efforts resulted in suspected illegitimate responses, possibly robot generated. The research team flagged, reviewed, and removed suspect or fraudulent responses using a detailed protocol guided by evidence-based practices.^{38,39} This process has been described elsewhere.^{40,41} The final sample for this analysis was limited to 298 farm parent participants. Currently, data are not available for download.

Results

A total of 298 farm parents completed the survey. The mean age of respondents was 42.3 years ($SD = 4.6$). Over half of respondents identified as male, and nearly 80% identified as white. Almost three quarters indicated they were a primary operator in a farm business, and 86.3% indicated they are a full-time farmer. The mean number of children under the age of 18 in the household was 1.6 ($SD = 0.8$) (Table 1). The sex, race, and ethnicity of our sample is consistent with what is described among the general U.S. farm operator population.⁴² Our sample is somewhat younger than U.S. farm operators (mean age = 58.6), but this was expected as participants must have reported being a parent of an adolescent.

Among agricultural producers, 28.3% reported minimal or no symptoms of depression, based on PHQ-9 scores. The remaining respondents reported symptoms across severity categories: 31.0% mild, 30.6% moderate, 9.1% moderately severe, and 1.0% severe. When scores were dichotomized at the threshold of ≥ 10 , 40.7% of respondents met criteria for probable depression.

Similarly, 32.3% of agricultural producers reported no or minimal symptoms of anxiety, 37.0% reported mild symptoms, 26.6% reported moderate symptoms, and 4.0% reported severe symptoms (Table 2). Using the conventional threshold of ≥ 10 , 30.6% met criteria for probable anxiety (Table 2).

Table 1. Demographics and health characteristics of farm parents (n = 298).

Demographic	N (%) or Mean (SD)
Age	42.3 (4.6)
Sex	
Male	189 (64.3%)
Female	105 (35.7%)
Race	
White	235 (78.9%)
Black or African American	48 (16.1)
Other	15 (5.0%)
Hispanic	55 (18.8%)
Veteran Status	21 (7.2%)
Education	
Less than high school	1 (0.3%)
High school diploma	102 (34.9%)
Associate degree	88 (30.1%)
Bachelor's degree	92 (31.5%)
Master's degree or higher	9 (3.1%)
Marital Status	
Married	282 (96.2%)
Divorced/Separated	9 (3.1%)
Single	2 (0.7%)
Mean number of children	1.6 (0.8)
Number of children in the household	1.5 (0.7)
Residence	
Rural	181 (60.9%)
Suburban	97 (32.7%)
Urban	19 (6.4%)
Primary farm/ranch operator (vs. partner or spouse)	219 (73.7%)
Farm full-time (vs. part-time)	251 (86.3%)
Mean number of children	1.6 (0.8)
Mean years farming	12.8 (5.8)
Median farm income (US Dollars)	120,000
Mean farm income (US Dollars)	303,771
Self-rated physical health	
Excellent	67 (22.6%)
Good	170 (57.2%)
Fair	60 (20.2%)
Poor	0 (0.0%)
Self-rated mental health	
Excellent	75 (25.6%)
Good	151 (51.5%)
Fair	62 (21.2%)
Poor	5 (1.7%)

Note: Not all variable totals equal $N = 298$ due to missing responses or skipped responses among respondents. All questions were voluntary.

Among the seven agricultural stress domains, the highest mean stress scores were observed in personal finances, time pressures, economic concerns, and environmental concerns – indicating these were perceived as the most stressful areas. Importantly, respondents who met the criteria for probable depression ($\text{PHQ-9} \geq 10$) reported significantly higher mean stress scores for seven stress domains. Similarly, respondents who met the criteria for probable anxiety ($\text{GAD-7} \geq 10$) reported significantly higher mean stress scores for all seven stress domains (Table 3).

Farm parents who met the criteria for probable depression ($\text{PHQ-9} \geq 10$) reported significantly

higher mean scores across all six economic indicators and reported a significantly higher debt to asset ratio. Similarly, respondents who met criteria for probable anxiety ($\text{GAD-7} \geq 10$) reported significantly worse financial indicators across all variables (Table 4).

Parenting style was significantly associated with multiple indicators of financial strain (Table 5). Farm parents with an authoritative style reported significantly fewer financial stressors across several domains – including less difficulty paying bills, more money left at the end of the month, fewer unmet material needs, and lower financial stress – compared to other parenting groups. In contrast,

Table 2. Symptoms of depression (PHQ-9) and anxiety (GAD-7) among farm parents.

PHQ-9 Score & Severity ^a	N (%)	N (%)
0 – 4: Minimal Depression	84 (28.3)	176 (59.3)
5 – 9: Mild Depression	92 (31.0)	213 (71.7)
10 – 14: Moderate Depression	91 (30.6)	121 (40.7)
15 – 19: Moderately Severe	27 (9.1)	
20 – 27: Severe	3 (1.0)	
GAD-7 Score & Severity ^b	N (%)	N (%)
0 – 4: Minimal Anxiety	96 (32.3)	206 (69.4)
5 – 9: Mild Anxiety	110 (37.0)	201 (67.7)
10 – 14: Moderate Anxiety	79 (26.6)	91 (30.6)
≥15: Severe Anxiety	12 (4.0)	

Note: “Probable” depression and anxiety defined as score ≥10 on PHQ-9 and GAD-7, respectively; ^a283 complete cases, *p*-value calculated using *n* = 176. ^b291 complete cases, *p*-value calculated using *n* = 297.

Table 3. Mean, standard deviation, range, and association between agricultural stressors and symptoms of depression and anxiety among farm parents (*N* = 298).

Stress Domain	N	Domain Mean Score (SD)	Domain Range	Symptoms of Depression			Symptoms of Anxiety		
				PHQ-9 ≤ 9 Mean (SD)	PHQ-9 ≥ 10 Mean (SD)	<i>p</i> -value	GAD-7 ≤ 9 Mean (SD)	GAD-7 ≥ 10 Mean (SD)	<i>p</i> -value
Hazardous working conditions (7 items)	269	2.9 (0.8)	1.0 - 5.0	2.8 (0.8)	3.0 (0.7)	0.006	2.8 (0.8)	3.1 (0.7)	0.004
Isolation (5 items)	270	2.8 (0.8)	1.0 - 4.8	2.6 (0.8)	3.1 (0.6)	<0.001	2.7 (0.8)	3.2 (0.6)	<0.001
Time pressures (4 items)	275	3.0 (0.8)	1.0 - 5.0	2.8 (0.8)	3.2 (0.6)	<0.001	2.8 (0.8)	3.3 (0.6)	<0.001
Personal finances (7 items)	273	3.1 (0.8)	1.0 - 4.9	3.0 (0.9)	3.2 (0.6)	0.005	3.0 (0.9)	3.2 (0.6)	0.004
Economics (5 items)	272	3.0 (0.8)	1.0 - 5.0	2.9 (0.9)	3.2 (0.6)	0.024	2.9 (0.8)	3.3 (0.6)	0.001
Environmental concerns (5 items)	272	3.0 (0.8)	1.0 - 5.0	2.9 (0.8)	3.2 (0.6)	<0.001	2.9 (0.8)	3.3 (0.7)	<0.001
Interpersonal relationships (8 items)	272	2.8 (0.7)	1.0 - 5.0	2.6 (0.7)	3.1 (0.6)	<0.001	2.6 (0.7)	3.2 (0.7)	<0.001

Table 4. Mean, standard deviation, range, and association between financial circumstance and symptoms of depression (PHQ-9) and anxiety (GAD-7) among farm parents (*N* = 298).

	N	Range	Symptoms of Depression			Symptoms of Anxiety		
	Mean (SD)		PHQ-9 ≤ 9 Mean (SD)	PHQ-9 ≥ 10 Mean (SD)	<i>p</i> -value	GAD-7 ≤ 9 Mean (SD)	GAD-7 ≥ 10 Mean (SD)	<i>p</i> -value
Difficulty paying bills ^a	289	1 – 4	1.96 (0.91)	2.57 (0.83)	<0.001	1.55 (0.76)	2.51 (0.83)	<0.001
Money left at end of month ^b	296	1 – 4	2.06 (0.89)	2.49 (0.89)	<0.001	1.74 (0.80)	2.47 (0.86)	<0.001
Unmet material needs ^c	296	1 – 5	2.35 (0.85)	2.71 (0.70)	<0.001	2.10 (0.83)	2.69 (0.73)	<0.001
Financial cutbacks ^d	295	0 – 0.97	0.24 (0.22)	0.31 (0.26)	0.016	0.16 (0.21)	0.32 (0.24)	<0.001
Negative financial events ^e	295	0 – 0.78	0.15 (0.17)	0.23 (0.22)	0.003	0.09 (0.13)	0.23 (0.21)	<0.001
Financial stress ^f	295	1 – 5	2.71 (1.07)	3.30 (0.70)	<0.001	2.19 (0.91)	3.31 (0.79)	<0.001
Debt to asset ratio ^g	264	0 – 19.4	0.33 (1.58)	0.58 (1.26)	<0.001	0.16 (0.27)	0.56 (1.75)	<0.001

^ahigher values indicate more difficulty, permissible range is 1–4, 270 complete cases, *p*-value calculated using *n* = 289

^bhigher values indicate more difficulty making ends meet, permissible range is 1–4; 277 complete cases, *p*-value calculated using *n* = 296.

^chigher values indicate more unmet need, permissible range is 1–5, 270 complete cases, *p*-value calculated using *n* = 296.

^dhigher values indicate more financial cutbacks, permissible range is 0–1, 255 complete cases, *p*-value calculated using *n* = 295.

^ehigher values indicate more negative financial events, permissible range is 0–1, 261 complete cases, *p*-value calculated using *n* = 295.

^fhigher values indicate more financial stress, permissible range is 1–5, 272 complete cases, *p*-value calculated using *n* = 295.

^gValues less than 1.0 indicate more asset value than debt, 247 complete cases, *p*-value calculated using *n* = 264.

Table 5. Association between economic indicators and parenting styles.

	Parenting Style				p-value
	Authoritative Mean (SD)	Authoritarian Mean (SD)	Permissive Mean (SD)	Uninvolved Mean (SD)	
Difficulty paying bills ^a	1.98 (0.88)	2.31 (0.86)	2.27 (1.13)	2.40 (0.88)	0.006
Money left at end of month ^b	2.02 (0.86)	2.38 (0.91)	2.45 (1.03)	2.37 (0.88)	0.012
Unmet material needs ^c	2.24 (0.78)	2.81 (0.81)	2.37 (0.75)	2.74 (0.77)	<.001
Financial cutbacks ^d	0.24 (0.22)	0.32 (0.23)	0.23 (0.24)	0.30 (0.25)	0.118
Negative financial events ^e	0.13 (0.16)	0.23 (0.21)	0.12 (0.13)	0.25 (0.23)	<.001
Financial stress ^f	2.70 (1.10)	3.12 (0.85)	3.05 (1.08)	3.16 (0.76)	0.007
Debt to asset ratio ^g	0.30 (0.45)	0.70 (1.99)	0.23 (0.32)	0.59 (2.14)	0.464

^ahigher values indicate more difficulty, permissible range is 1–4.

^bhigher values indicate more difficulty making ends meet, permissible range is 1–4.

^chigher values indicate more unmet need, permissible range is 1–5.

^dhigher values indicate more financial cutbacks, permissible range is 0–1.

^ehigher values indicate more negative financial events, permissible range is 0–1.

^fhigher values indicate more financial stress, permissible range is 1–5.

^gValues less than 1.0 indicate more asset value than debt.

uninvolved and authoritarian parents reported significantly higher levels of financial stress and greater exposure to negative financial events.

The most common parenting style among agricultural producers was authoritative (41.6%), followed by uninvolved (36.5%), permissive (11.1%), and authoritarian (10.8%) (Table 6). Authoritative parents were significantly less likely to meet criteria for probable depression and anxiety (PHQ-9 and GAD-7 ≥ 10), while uninvolved parents were significantly more likely to meet those thresholds.

Discussion

This study examined associations between core economic constructs of the Family Stress Model (FSM), farm parents' mental health, and parenting styles. Relatively little research has investigated these relationships within U.S. farm families, despite the central role of financial pressures in agricultural life.

Mental health burden among farm adults

Consistent with prior research, our findings underscore a high prevalence of poor mental health among agricultural producers.^{3,7,10} In our sample, 40.7% met the criteria for probable depression (PHQ-9 ≥ 10), and 30.6% met the criteria for probable anxiety (GAD-7 ≥ 10). These estimates are higher than what is typically observed among the U.S. general population,⁴³ but it is consistent with estimates among farm and ranch populations.^{7,44} However, comparisons with farm populations should be interpreted cautiously, as instruments to assess symptoms of mental health conditions, sampling strategies, and methods vary. Future efforts should encourage consistency among instruments to assess for mental health conditions. Generalized Anxiety Disorder (GAD) and depression are among the most common mental health conditions of adults in the U.S.,⁴³ and if undiagnosed and untreated, it can lead to chronic health conditions and reduced

Table 6. Parenting styles and probable depression/anxiety ($N = 296$).

	N (%)	Symptoms of Depression			Symptoms of Anxiety		
		PHQ-9 ≤ 9 n (%)	PHQ-9 ≥ 10 n (%)	p-value	GAD-7 ≤ 9 n (%)	GAD-7 ≥ 10 n (%)	p-value
Authoritative ^a	123 (41.6%)	89 (5.9%)	34 (28.1%)	<.001	97 (47.3%)	26 (28.6%)	0.002
Authoritarian ^b	32 (10.8%)	11 (6.3%)	21 (17.4%)		15 (7.3%)	17 (18.7%)	
Permissive ^c	33 (11.1%)	23 (13.1%)	10 (8.3%)		24 (11.7%)	9 (9.9%)	
Uninvolved ^d	108 (36.5%)	52 (29.7%)	56 (46.3%)		69 (33.7%)	39 (42.9%)	

^ahigh on involvement and high on control, 118 complete cases, p-value calculated using $n = 123$.

^blow on involvement and high on control, 32 complete cases, p-value calculated using $n = 32$.

^chigh on involvement and low on control, 33 complete cases p-value calculated using $n = 33$.

^dlow on involvement and low on control, 99 complete cases, p-value calculated using $n = 108$.

quality of life.⁴⁵ Screening the farm population for symptoms of anxiety and/or depression and intervening early can inform family and community-based interventions.

Farm adults reported the highest stress around personal finances, economics, and environmental conditions, time pressures, and environmental concerns, echoing similar stressors of agricultural producers from around the U.S.^{46–48} The mean stress scores across domains varied only slightly (2.8–3.1), which limited the ability to identify the most acute stressors. Agricultural producers who met criteria for probable depression and anxiety consistently reported higher mean stress scores across all seven domains, aligning with prior research that links elevated stress to poor mental health in agricultural populations.⁷

Economic stress and mental health symptoms

Consistent with the FSM, economic hardship was significantly associated with elevated symptoms of anxiety and depression. Farm adults who reported less favorable financial circumstances, across all economic indicators, were more likely to meet criteria for probable depression (PHQ-9 $\geq$ 10) and probable anxiety (GAD-7 $\geq$ 10). Financial stressors such as those identified in this study are well-documented in the agricultural literature.^{3,7,46,48–50} However, prior work often lacks contextualization of how these stressors manifest within the household. Our findings extend this literature by identifying how specific economic indicators – like unmet material needs and financial cutbacks – are associated with psychological distress in agricultural populations and provide insight into how low commodity prices or increasing input costs may be financially experienced by farm families.

Relatively little research has examined associations between economic conditions and mental health, specifically among U.S. farmers and ranchers. However, adverse economic conditions have been associated with poor mental health in other populations. For example, during the Covid-19 pandemic, widespread financial uncertainty contributed to increased psychological distress, particularly among women, Hispanic individuals, and those in poor

physical health.⁵¹ The scale of economic disruption rivalled that of the Great Depression.⁵²

Agriculture, as a tumultuous industry, experiences routine and dramatic economic turbulence. The farm crisis of the 1980s led to widespread bankruptcies. In the 1990s, a sharp collapse in hog prices forced thousands of producers out of business.⁵³ The early 2010s saw a major downturn in the dairy industry, driven by overproduction and a surge in cow numbers, which sent milk prices plummeting.⁵⁴ More recently, grain farmers have operated at net losses due to the combined pressures of international tariffs and oversupply. Currently, the threat of tariffs and oversupply have pushed grain prices to recent lows and grain farmers operating at net losses.⁵⁵ The frequency of which sectors of the agricultural industry experience economic distress could have dramatic and lasting impacts on individual and family health and wellbeing. However, these results are limited to associations due to the cross-sectional study design. There is a need for longitudinal research among families to describe and quantify the causal effect of economic hardship on farm family members' mental health.

In addition to subjective financial stress indicators, the debt-to-asset ratio emerged as a meaningful objective marker of economic strain. Consistent with the Family Stress Model,⁵⁶ financial indicators such as debt load may contribute to increased emotional and behavioral health risks. In our sample, farm adults that reported higher debt-to-asset ratios were also more likely to meet the criteria for probable anxiety and probable depression. Among those with probable depression, the mean debt to asset ratio was 0.55 and among those with probable anxiety, the mean debt to asset ratio was 0.56. Generally speaking, a ratio above 0.55 indicates financial stress.⁵⁷ The reported means for our sample of adults that also met the criteria for probable depression and anxiety are nearing the stressed threshold and are considerably higher than the average farm business in 2022.⁵⁷ These findings support FSM theory by illustrating how objective financial hardship – such as high debt relative to assets – may compound subjective stressors like difficulty meeting basic needs,

thereby increasing vulnerability to symptoms of anxiety and depression.⁵⁸

The ripple effects of economic stress on parenting and family well-being

The FSM posits that economic pressure affects more than individual emotional health – it also disrupts family relationships and parenting practices. Financial strain can increase conflict between adult partners, reduce emotional availability, and contribute to harsher, less consistent parenting. For example, lower family income has been linked to greater use of harsh discipline and a higher likelihood of externalizing behaviors among children.⁵⁹

Among farm parents in this study, those categorized as authoritative, characterized by high involvement and communicative parenting, reported significantly lower mean economic stress scores across the six economic indicators (difficulty paying bills, money left at the end of the month, unmet material needs, financial cutbacks, and negative financial events). In contrast, authoritarian and uninvolved parents reported the highest mean economic stress scores across all domains. These patterns suggest economic strain may erode parents' capacity to provide consistent, engaged, and nurturing parenting.

Importantly, parenting style was also linked to mental health. Authoritative parents were significantly less likely to meet the criteria for probable anxiety and depression, whereas uninvolved parents were more likely to meet the criteria for probable anxiety and depression. Our results are consistent with others that have demonstrated a relationship between economic pressure, emotional distress, and ultimately disrupted parenting practices.^{27,28,59}

The impact of harsh or inconsistent parenting on children includes increased internalizing and externalizing behaviors and lower positive child adjustment.²⁸ Thus, the impacts of financial hardship within farm families may ripple outward, affecting not only the well-being of individual parents but also the health and development of children and adolescents. Interventions and policy efforts should prioritize whole-family approaches to reduce the intergenerational consequences of economic stress.

Limitations

This study has several limitations. The relatively small sample size, particularly given the broad geographic recruitment, restricts the generalizability of the findings. The sample is not fully representative of U.S. farm families, as participants were somewhat younger, predominantly white, and more likely to be full-time farmers compared to national averages. Recruitment strategy may have introduced bias into who was aware of the study and mental health status, or economic status of farm families may have influenced who participated in the study, further introducing bias. We cannot rule out attrition bias, as those under greater stress may have been less likely to complete the survey. Missing data were minimal (0.3%) and handled using mean imputation, but this approach may inflate p-values. Future research with agricultural populations should use consistent instruments to assess anxiety, depression, and economic factors to enable more direct comparisons across studies. We have addressed additional design and recruitment concerns – such as online survey validity and response verification – in detail elsewhere.^{40,41} The cross-sectional design also prevents causal conclusions or identification of temporal ordering among economic hardship, mental health, and parenting outcomes. In light of these limitations, the results add valuable insight and strengthen the growing body of literature on how economic conditions relate to the health and safety of agricultural producers.

Conclusion

This study provides new insight into how economic hardship is associated with the mental health and parenting practices of U.S. farm families, offering empirical support for the FSM in an agricultural context. Results reveal financial stressors – ranging from difficulty paying bills to higher debt-to-asset ratios – are strongly associated with symptoms of anxiety and depression among farm parents. These stressors are also associated with parenting behaviors, with authoritative parents reporting both lower financial strain and better mental health outcomes, while uninvolved parents experienced elevated stress and poorer well-being.

Importantly, these findings demonstrate that the consequences of economic hardship extend beyond individual distress, affecting family dynamics and potentially placing children at risk for emotional and behavioral challenges. In doing so, this study highlights the need for family-centered, preventive approaches to support rural and agricultural populations, including interventions that address economic strain, bolster parental mental health, and promote consistent, supportive parenting.

Disclosure statement

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