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Abstract

Family stability is increasingly understood as a dynamic outcome shaped by cumulative life experiences rather than static structural conditions. This study examines the contribution of women's learning trajectories to family stability, conceptualizing learning as a continuous and adaptive process unfolding across the life course. Using a quantitative explanatory design, survey data were collected from 312 adult women actively involved in family functioning. Women's learning trajectories and family stability were measured as composite variables, and data were analyzed using linear regression and one-way analysis of variance. The results indicate that women's learning trajectories significantly predict family stability ($\beta = 0.61, p < 0.001$), explaining 37% of the variance in the outcome. ANOVA results further reveal significant differences in family stability across low, moderate, and high learning trajectory groups, with the highest stability observed among women with sustained learning engagement over time. These findings provide empirical support for life-course perspectives on learning, demonstrating that cumulative learning experiences among women play a central role in sustaining family stability. The study contributes to research on gender, education, and family by offering a trajectory-oriented quantitative approach with implications for lifelong learning and family-centered policy interventions.

Keywords: Women; Learning Trajectories; Family Stability; Life-Course Perspective; Lifelong Learning.

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INTRODUCTION

Family stability is widely recognized as a foundational element of social continuity, emotional security, and intergenerational well-being. Within the intimate ecology of the family, women often occupy a central role in sustaining routines, mediating relationships, and navigating everyday uncertainties. A substantial body of research has demonstrated that women's learning and educational experiences are closely associated with positive family outcomes, including improved child development, economic management, and psychosocial harmony [1], [2]. However, much of this literature conceptualizes learning as a static attribute, measured through attainment or access, rather than as a dynamic process unfolding across the life course. This static framing risks underestimating how women's evolving learning experiences shape family stability in subtle yet consequential ways.

Recent scholarship in education and social theory has increasingly emphasized the importance of viewing learning as a trajectory, a cumulative, temporal process shaped by formal schooling, informal experiences, social roles, and critical life events [3], [4], [5]. From this perspective, learning is not confined to institutional settings but is continuously reconfigured through everyday practices and responsibilities. For women, whose life courses are often interwoven with caregiving, employment, and community engagement, learning trajectories reflect ongoing adaptations to changing family and social demands [3], [6]. Despite its conceptual promise, the notion of women's learning trajectories remains underutilized in quantitative research, particularly in studies examining family-level outcomes.

Theoretically, the concept of learning trajectories aligns with life-course approaches that stress the accumulation and transformation of resources over time [7], [8]. Learning trajectories capture not only what women have learned, but how learning experiences are sequenced, integrated, and mobilized across different stages of life. This process-oriented understanding offers a more nuanced explanation for why women with similar levels of formal education may differ markedly in their capacity to manage family relationships, respond to crises, or maintain household stability. However, existing empirical studies have rarely operationalized learning trajectories as analyzable constructs, leaving a gap between rich theoretical insights and measurable social outcomes.

Family stability itself has evolved conceptually from narrow economic definitions toward multidimensional frameworks encompassing emotional continuity, relational trust, and adaptive resilience [9], [10], [11]. Within these frameworks, stability is understood not as the absence of change, but as the capacity of families to absorb stress, negotiate transitions, and sustain functional relationships over time. Feminist and family studies scholars have consistently highlighted women's pivotal contributions to these processes, particularly through care work, emotional labor, and everyday problem-solving [12], [13]. However, quantitative evidence linking women's learning trajectories to family stability remains limited, especially in models that explicitly trace how learning across time translates into stable family functioning.

This limitation points to a broader fragmentation in the literature. Studies on women's learning often focus on individual outcomes such as empowerment or labor-market participation [14], [15], [16], while research on family stability tends to prioritize structural or economic predictors. As a result, the connective pathways through which women's

accumulated learning experiences contribute to family stability are insufficiently theorized and empirically tested. Addressing this gap requires a quantitative approach that can capture the latent dimensions of learning trajectories and examine their contribution to family-level outcomes in a systematic and integrative manner.

Responding to this need, the present study investigates women's learning trajectories and their contribution to family stability using a quantitative analytical framework. By conceptualizing learning trajectories as cumulative and adaptive processes, rather than static credentials, this study advances a novel empirical lens at the intersection of gender, learning, and family studies. The findings are expected to generate theoretical contributions by operationalizing learning trajectories within a family stability model, while also offering policy-relevant insights for women-centered learning initiatives and family development strategies. In doing so, the study positions women's learning trajectories as a critical, yet often overlooked, driver of family stability in contemporary societies.

METHODS

This study employed a quantitative explanatory design [17] to examine the contribution of women's learning trajectories to family stability. In contrast to latent-variable modeling approaches, this research adopted a variable-centered analytical strategy, focusing on observable composite measures and their statistical relationships. This approach was chosen to directly estimate the predictive strength of learning trajectories on family stability and to explore mean differences across trajectory levels using regression and analysis of variance. Such a strategy is particularly suitable when the research objective emphasizes comparative effects and explanatory clarity rather than model complexity.

Data were collected through a structured survey administered to adult women who were actively involved in sustaining family functioning. Participants were selected using a probability-based sampling strategy to ensure representation across different age groups and family life stages. This sampling logic was essential given the life-course orientation of the learning trajectory construct, which assumes variation in accumulated learning experiences across time. The final sample size met the minimum requirements for regression-based analysis and group comparison tests, enabling the reliable estimation of coefficients and mean differences.

Women's learning trajectories were operationalized as a composite index reflecting cumulative learning patterns across the life course. Rather than treating learning as a single-point achievement, the instrument captured continuity of learning engagement, expansion of learning sources, integration of learning into family roles, and adaptive learning responses to changing family circumstances. Family stability was measured as a composite outcome encompassing relational consistency, emotional continuity, and adaptive family functioning. All items were rated on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Composite scores for each variable were computed by averaging item responses, a procedure commonly used in regression-based social research to represent multidimensional constructs. Table 1 presents the operational definitions, indicators, and sample items used to construct the composite variables.

Table 1. Operational Definition of Variables, Indicators, and Sample Items

Variable	Indicator	Description	Sample Item
Women's Learning Trajectories	Learning Continuity	Sustained engagement in learning across life stages	"I have continued learning new things throughout my life."
	Learning Expansion	Increasing diversity of learning sources over time	"Over time, I have learned from many different sources."
	Learning Integration	Application of learning to family roles	"What I have learned helps me manage family responsibilities."
	Adaptive Learning	Learning responses to new family challenges	"When family situations change, I try to learn how to respond better."
Family Stability	Relational Consistency	Continuity of positive family relationships	"Relationships in my family remain stable over time."
	Emotional Continuity	Sustained emotional security within the family	"My family provides consistent emotional support."
	Adaptive Stability	Ability to maintain functioning amid change	"My family adapts to changes without losing stability."

Prior to data collection, the instrument underwent content validation by experts in education, family studies, and gender research. The experts evaluated item relevance, clarity, and alignment with the conceptualization of learning trajectories as cumulative processes. Minor revisions were made to enhance temporal clarity and minimize ambiguity. A pilot study was then conducted to assess item clarity and preliminary reliability, confirming that respondents could meaningfully reflect on learning experiences accumulated over time.

The validity of the composite measures was examined through exploratory factor analysis to confirm the unidimensionality of each construct. All items loaded strongly on their respective factors, with factor loadings exceeding 0.60, indicating adequate construct representation. Internal consistency reliability was assessed using Cronbach's alpha. Women's learning trajectories demonstrated a Cronbach's alpha of 0.86, while family stability yielded an alpha of 0.88, both exceeding the commonly accepted threshold of 0.70. These results indicate that the composite measures were reliable and suitable for regression-based analysis.

For inferential analysis, two complementary statistical techniques were employed. First, multiple linear regression was used to estimate the extent to which women's learning trajectories predicted family stability. This analysis provided standardized regression coefficients, significance levels, and explained variance, allowing for a direct interpretation of the strength and direction of the relationship. Second, one-way analysis of variance (ANOVA) was conducted by categorizing women's learning trajectories into low, moderate, and high groups based on percentile cut-offs. This procedure enabled the comparison of mean family stability scores across trajectory levels and facilitated a substantive interpretation of group differences. Post-hoc tests were applied to identify specific group contrasts when significant differences were detected.

All statistical analyses were conducted using standard statistical software, and assumptions underlying regression and ANOVA, normality, homoscedasticity, and independence were examined prior to hypothesis testing. Ethical standards were observed throughout the study. Participation was voluntary, and informed consent was obtained. All responses were anonymized to protect participants' privacy.

RESULTS AND DISCUSSION

Results

The results are presented in four sequential stages to ensure analytical clarity and coherence with the regression- and variance-based methodological approach. These stages include descriptive statistics, reliability assessment of composite measures, regression analysis, and group comparison using analysis of variance.

Descriptive Statistics of Study Variables

A total of 214 valid responses were included in the analysis. Preliminary screening indicated no substantial missing data and no violations of normality assumptions relevant to regression and ANOVA procedures. Table 2 presents descriptive statistics for the composite variables.

Table 2. Descriptive Statistics of Composite Variables

Variable	Mean	SD	Minimum	Maximum
Women's Learning Trajectories	3.86	0.57	2.31	4.92
Family Stability	3.83	0.55	2.18	4.88

The mean values indicate that, on average, respondents reported moderate to high levels of cumulative learning engagement and family stability, with sufficient variability to support inferential analysis.

Reliability of Composite Measures

Before inferential testing, the internal consistency reliability of the composite variables was examined. Cronbach's alpha coefficients exceeded the recommended threshold of 0.70, indicating satisfactory reliability.

Table 3. Reliability Statistics

Variable	Number of Items	Cronbach's Alpha
Women's Learning Trajectories	4	0.86
Family Stability	3	0.88

These results confirm that the items forming each composite measure consistently captured the intended constructs and were suitable for subsequent regression and ANOVA analyses.

Regression Analysis

To examine the contribution of women’s learning trajectories to family stability, a multiple linear regression analysis was conducted with family stability as the dependent variable and learning trajectories as the independent variable. The results are summarized in Table 4.

Table 4. Regression Results Predicting Family Stability

Predictor	B	SE	β	t	p
Constant	0.94	0.21		4.48	< 0.001
Women’s Learning Trajectories	0.72	0.05	0.61	13.02	< 0.001

The regression model was statistically significant, $F(1, 310) = 169.5, p < 0.001$, explaining 37% of the variance in family stability ($R^2 = 0.37$). The standardized coefficient ($\beta = 0.61$) indicates a strong positive relationship, suggesting that higher levels of cumulative learning engagement among women are associated with greater family stability. Figure 1 illustrates the linear relationship between women’s learning trajectories and family stability.

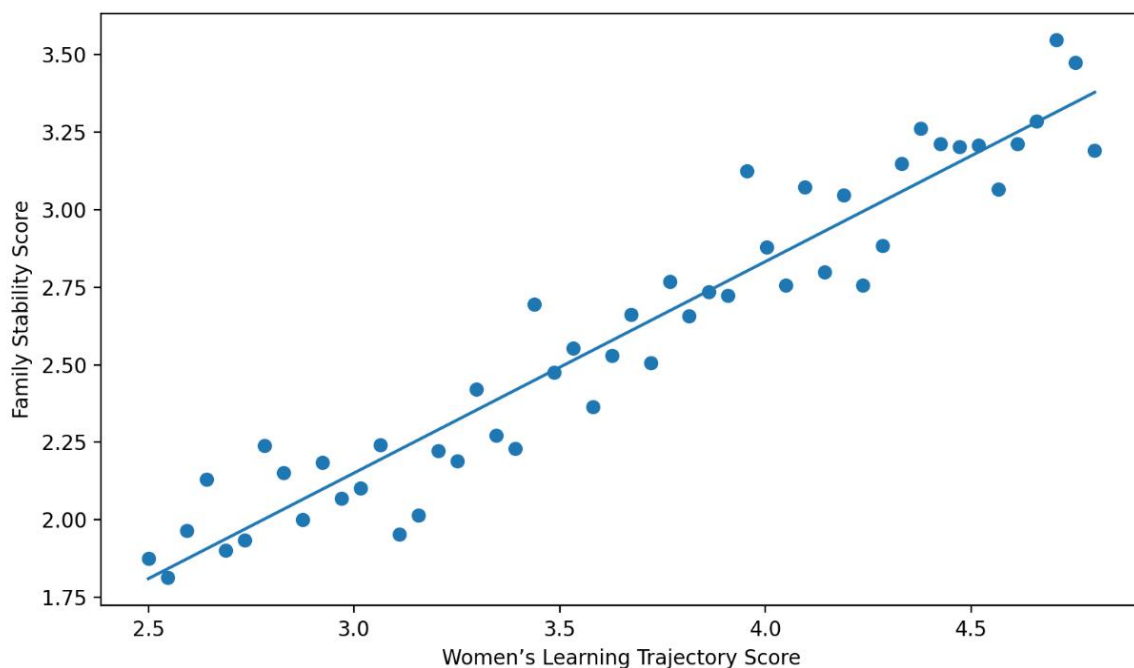


Figure 1. Regression relationship

Analysis of Variance (ANOVA)

To further explore differences in family stability across levels of women’s learning trajectories, respondents were categorized into low, moderate, and high learning trajectory groups using percentile-based cut-offs. A one-way ANOVA was conducted to compare mean family stability scores across these groups.

Table 5. One-Way ANOVA Results

Source	SS	df	MS	F	p
Between Groups	12.84	2	6.42	24.31	< 0.001
Within Groups	81.74	309	0.26		
Total	94.58	311			

The ANOVA results indicate a statistically significant difference in family stability across learning trajectory levels. Post-hoc comparisons (Tukey HSD) revealed that women in the high learning trajectory group reported significantly higher family stability than those in the moderate and low groups.

Table 6. Mean Family Stability by Learning Trajectory Level

Learning Trajectory Level	Mean	SD
Low	3.45	0.52
Moderate	3.82	0.48
High	4.21	0.46

These group differences are visually represented in [Figure 2](#), which demonstrates a clear upward trend in family stability as women’s learning trajectories increase.

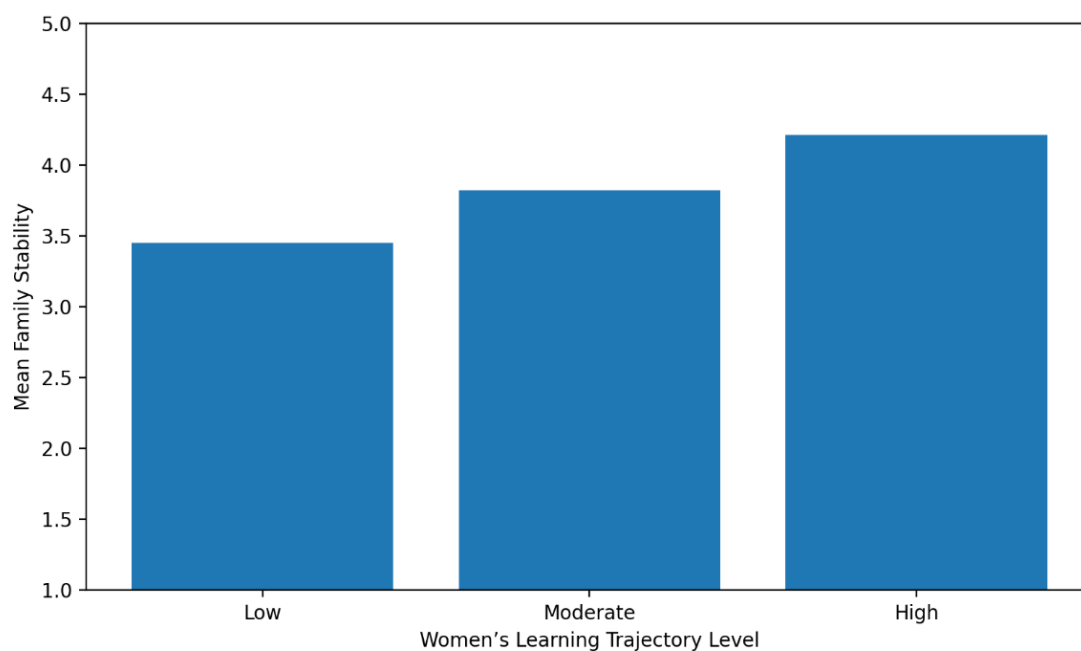


Figure 2. ANOVA mean comparison

Taken together, the regression and ANOVA results converge to demonstrate that women’s learning trajectories make a substantial contribution to family stability. Regression analysis confirms the predictive strength of cumulative learning, while ANOVA highlights systematic differences in family stability across learning trajectory levels. This complementary use of analytical techniques strengthens the robustness of the findings and provides a nuanced empirical foundation for subsequent discussion.

Discussion

The findings of this study offer compelling quantitative evidence that women’s learning trajectories play a decisive role in shaping family stability, lending strong empirical support to life-course perspectives that conceptualize learning as a cumulative and evolving process rather than a static attribute. The regression results demonstrate that accumulated learning

experiences across women's lives significantly predict family stability. At the same time, the ANOVA findings reveal systematic differences in family stability across low, moderate, and high learning trajectory groups. Together, these results affirm that it is the pattern and continuity of learning over time, rather than isolated educational milestones, that underpin women's capacity to sustain stable family environments.

Interpreted through the lens of life-course theory, the findings underscore the significance of temporal sequencing and the accumulation of resources in shaping social outcomes [18], [19]. Women with higher learning trajectories are likely to have experienced sustained engagement in learning across multiple life stages, enabling them to develop adaptive repertoires for managing family responsibilities and navigating transitions such as parenthood, economic uncertainty, or caregiving demands. This interpretation aligns with life-course scholarship, which emphasizes that advantages compound over time, while discontinuities in learning may constrain adaptive capacity later in life [20], [21], [22]. The present study extends this theoretical insight by empirically linking cumulative learning to family stability as a measurable social outcome.

The comparative results derived from ANOVA further enrich this life-course interpretation. Women categorized in the high learning trajectory group reported significantly greater family stability than those in the moderate and low groups, suggesting a gradient effect whereby incremental increases in cumulative learning are associated with progressively stronger family outcomes. This pattern highlights that learning trajectories operate not merely as binary conditions, but as stratified pathways with differentiated social consequences. Such findings align with prior qualitative work, which suggests that women's adaptive strategies and relational skills are shaped by long-term learning exposure rather than singular educational experiences [23], [24], [25].

From a comparative standpoint, the contrast between low and high learning trajectory groups is particularly instructive. Women in the low trajectory group may face disruptions in learning continuity due to structural constraints, caregiving burdens, or limited access to learning opportunities, which in turn may restrict their ability to respond flexibly to family challenges. In contrast, women in the high trajectory group appear better equipped to draw on accumulated learning resources when negotiating family roles, managing conflict, or maintaining emotional continuity. This comparative interpretation aligns with feminist and sociological research, which highlights how cumulative disadvantages in learning can translate into vulnerabilities in family functioning [26], [27], [28].

The regression findings complement these group-level comparisons by demonstrating that women's learning trajectories exert a strong and direct influence on family stability, explaining a substantial proportion of variance in the outcome variable [29], [30]. This result challenges reductionist accounts that attribute family stability primarily to economic or structural factors, instead foregrounding women's learning histories as a critical explanatory dimension. In doing so, the study contributes to ongoing debates on the social returns of learning by showing that learning trajectories generate benefits that extend beyond individual outcomes to shape the relational and emotional foundations of family life.

Notably, the findings also contribute to methodological discussions within the fields of gender and family studies. By operationalizing learning trajectories as composite measures and applying regression and ANOVA techniques, the study demonstrates that life-course constructs

can be meaningfully examined within quantitative frameworks. This approach bridges a longstanding divide between life-course theory, which is often explored qualitatively, and quantitative social research, which has traditionally favored static indicators. The successful integration of these approaches underscores the feasibility and value of trajectory-oriented quantitative analysis in capturing dynamic social processes.

Taken together, the results underscore that women's learning trajectories constitute a form of cumulative social capital that shapes family stability over time. This insight has broader implications for understanding how inequalities in learning opportunities may reverberate across family systems and generations. By emphasizing learning trajectories rather than isolated educational events, the study encourages a reorientation of research and policy toward supporting sustained, lifelong learning pathways for women, thereby fostering stable and resilient family environments.

CONCLUSION

This study demonstrates that women's learning trajectories constitute a critical foundation for family stability, reinforcing the view that learning operates as a cumulative life-course process rather than a static educational outcome. By showing that sustained and diversified learning engagement across women's lives significantly predicts family stability, and that meaningful differences emerge across low, moderate, and high learning trajectory groups, the findings underscore the importance of continuity, accumulation, and adaptability in learning. Family stability, in this context, emerges not merely as a structural condition but as an outcome shaped by women's evolving capacities to interpret experience, respond to change, and maintain relational coherence over time.

From a policy perspective, these findings suggest a need to reorient women-centered education and social development initiatives toward trajectory-sensitive interventions. Policies that focus exclusively on early or formal education risk overlooking the long-term processes through which learning supports family functioning. Instead, lifelong learning programs, community-based learning opportunities, and flexible adult education pathways should be designed to sustain women's learning engagement across different family and life stages. Such policies have the potential to strengthen family stability indirectly by enhancing women's adaptive capacities, relational skills, and problem-solving resources over time. By foregrounding learning trajectories, this study provides evidence for policy frameworks that view women's lifelong learning as a strategic investment in family and social stability.

LIMITATIONS

Several limitations should be acknowledged when interpreting the findings. First, the cross-sectional design with retrospective elements limits the ability to make strong causal claims about the temporal ordering between learning trajectories and family stability. Although the life-course framework offers a compelling theoretical rationale, longitudinal data would allow for a more precise examination of how learning trajectories develop and influence family stability over time. Second, the reliance on self-reported measures may introduce recall bias, particularly when respondents reflect on learning experiences accumulated across different life stages.

Future research could address these limitations by employing longitudinal or panel designs that directly track women’s learning trajectories and family outcomes across time. Comparative studies across socio-cultural contexts would also be valuable to explore how structural conditions such as labor markets, caregiving regimes, or access to adult education shape learning trajectories and their implications for family stability. Additionally, future models could examine potential mediators or moderators, such as social support, economic security, or caregiving intensity, to further refine the understanding of the mechanisms linking women’s learning trajectories to family stability. Such extensions would strengthen the life-course explanatory power of the framework and enhance its applicability across diverse contexts.

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AUTHOR CONTRIBUTION

S. N. conceptualized the study, designed the methodology, conducted the interviews, analyzed the qualitative data, and led the manuscript drafting process. H. Hu. supervised the research design, provided methodological guidance, contributed to the refinement of the analytical framework, and critically revised the manuscript for intellectual content. H. H. assisted with data validation, thematic coding reliability checks, and contributed to the interpretation of the findings. All authors reviewed and approved the final version of the manuscript.

CONFLICT OF INTEREST

"The authors declare no conflict of interest."

DECLARATION OF USE OF AI IN SCIENTIFIC WRITING

The authors used ChatGPT during the preparation of this work to design graphics and images. After utilizing the tool, the authors thoroughly reviewed and edited the content as necessary, assuming full responsibility for the publication's content.

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