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A Grounded Theory Approach to Analyzing Psychological Risks and Injuries in Child Labor: Insights from Expert Interviews

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ABSTRACT

Objective: Child labor remains a significant global issue, with profound psychological, educational, and social consequences. While the physical risks of child labor are well-documented, its psychological impacts require further exploration.

Methods and Materials: This qualitative study employs a grounded theory approach to develop a conceptual framework for understanding the psychological risks and injuries associated with child labor. Data were collected through semi-structured interviews with 18 experts from various child welfare organizations in Iran. Latent Dirichlet Allocation (LDA) and Correlated Topic Models (CTM) were used for text mining and thematic analysis.

Findings: Five key dimensions emerged from the analysis: (1) Mental Health Impacts, including increased prevalence of depression, anxiety, and PTSD; (2) Educational Disruption, emphasizing lower academic attainment and cognitive delays; (3) Physical Health Risks, covering injuries, hazardous work conditions, and long-term developmental effects; (4) Exploitation and Abuse, highlighting forced labor, trafficking, and violence; and (5) Social Isolation and Stigma, underscoring discrimination and limited social development.

Conclusion: By integrating grounded theory and advanced text analysis techniques, this study provides a nuanced understanding of the psychological toll of child labor. Findings have critical implications for policy development, mental health interventions, and educational programs aimed at mitigating these risks. Future research should explore longitudinal effects and intervention efficacy to inform comprehensive child protection strategies.

Keywords: Child labor, psychological risks, grounded theory, expert interviews, topic modeling, mental health.

Introduction

Child labor, defined as the employment of children in any work that deprives them of their childhood, interferes with their ability to attend school, and is harmful to their physical and mental development (International Labor Organization, 2021), remains a pervasive problem worldwide. Child labor remains a pressing global issue, with an estimated 160 million children engaged in child labor worldwide (International Labor Organization, 2021). Despite international efforts to eradicate this practice, the complex interplay of economic, social, and cultural factors continues to perpetuate the exploitation of children in various forms of work. Understanding the multifaceted consequences of child labor, particularly the psychological and physical risks, is crucial for developing effective interventions and promoting the well-being of affected children. Despite efforts to eliminate child labor, it continues to persist due to a variety of factors, including poverty, lack of access to education, and cultural norms (Bourdillon et al., 2010). While the physical

risks associated with child labor have been well-documented, the psychological impacts and long-term consequences on children's mental health are areas that require further exploration and analysis (Woodhead, 2004). Some studies have highlighted the prevalence of mental health issues, including depression, anxiety, and post-traumatic stress disorder (PTSD), among child laborers (UNICEF, 2023). These psychological challenges can have long-lasting consequences, affecting children's educational attainment, social relationships, and overall quality of life.

Understanding the psychological risks and injuries associated with child labor is crucial for several reasons. First, child labor can have a negative impact on children's cognitive, emotional, and social development (Bourdillon et al., 2010). Second, children who have experienced psychological injuries may be at increased risk for mental health problems later in life (Lundgren, 2014). Third, understanding the psychological risks and injuries associated with child labor can inform policy and practice aimed at preventing and addressing these risks.

This study aims to delve deeper into the psychological risks and injuries associated with child labor by leveraging the insights of 18 experts who work closely with affected children. These experts, with firsthand experience in the field, provided valuable insights into the various aspects of child labor, including the types of work children engage in, the dangers they face, and the mental health implications of their work environments. The objective of this research was to analyze the expert responses using a robust statistical technique, topic modeling, to identify the key themes and patterns emerging from their insights. We interviewed 18 experts in the field of child labor and asked them 10 questions related to the psychological risks and injuries associated with child labor.

Methodologically, this study introduces an innovative approach to analyzing qualitative data in the field of child labor research. We employ topic modeling, a text-based factor analysis method. Topic modeling is a text mining method that we applied it here that automatically discovers latent topics within a corpus of text documents (Blei et al., 2003). By applying this technique, we aimed to uncover the underlying themes and patterns related to child labor risks and injuries that may not be readily apparent through traditional analysis methods. topic modeling in uncovering latent themes and patterns within expert narratives that might be overlooked by conventional analytical methods (Blei, 2012; Blei & Lafferty, 2007; Blei et al., 2003).

The significance of this research lies in its potential to provide a more nuanced understanding of the psychological dimensions of child labor. By synthesizing expert knowledge through advanced text analysis techniques, we aim to contribute valuable insights to inform policy-making, intervention strategies, and future research directions in combating child labor and mitigating its harmful effects on children's mental health and well-being (Fassa, 2003; Fassa et al., 2010). Through this study, we aspire to shed light on the often-overlooked psychological toll of child labor and demonstrate the potential of innovative text analysis methods in advancing our understanding of complex social issues. The findings of this research have important implications for policymakers, practitioners, and researchers working to address child labor and promote the well-being of affected children. The findings of this study are expected to contribute to the existing body of knowledge on child labor by providing a comprehensive analysis of the psychological impacts from the perspective of experts in the field, too.

Methods and Materials

Study Design and Participants

This study employs a grounded theory approach to develop a conceptual framework for understanding the psychological risks and injuries associated with child labor. Grounded theory was selected because it is particularly well-suited for exploring complex, under-theorized phenomena and generating data-driven theoretical insights. Unlike case studies or phenomenological analysis, which focus on specific cases or individual experiences, grounded theory allows for the systematic development of a theoretical model based on patterns emerging from qualitative data. Given the lack of a structured framework for examining the psychological toll of child labor, this approach was deemed most appropriate for generating new insights and explaining the relationships between identified themes.

The study involved 18 expert participants who were selected using purposive sampling, ensuring that individuals with extensive knowledge and firsthand experience in child labor and child welfare were included. Participants were drawn from psychologists, social workers, representatives of child rights protection associations, and directors of children's homes and support centers. The sample included 16 women and 2 men, reflecting the gender distribution commonly found in child welfare professions in Iran. Participants'

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professional backgrounds ranged from mental health specialists working with at-risk youth to policymakers engaged in child labor prevention initiatives. While the sample size may be considered small for a qualitative study, saturation was achieved, meaning that no new themes emerged from the final interviews, indicating sufficient depth of data collection.

Instruments

Data were collected through semi-structured interviews conducted in person and via online platforms, each lasting between 45 to 90 minutes. The interview questions were designed to be open-ended and exploratory, ensuring that participants could provide detailed, experience-based insights rather than brief or constrained responses. Questions focused on topics such as the psychological consequences of child labor, coping mechanisms, mental health interventions, and policy recommendations.

To enhance the credibility and trustworthiness of the study, the interview guide was developed through an iterative process, beginning with a review of existing literature and expert consultations. The final set of questions was piloted with three professionals to ensure clarity and relevance, with minor modifications made based on their feedback. The interviews were audio-recorded with participant consent and transcribed verbatim for analysis.

Data Analysis

Data were analyzed using ATLAS.ti software, employing grounded theory's structured coding techniques: open coding, axial coding, and selective coding (Strauss & Corbin, 1998). The open coding phase involved an initial review of the transcripts to identify recurring themes and conceptual categories. In axial coding, these categories were refined and linked to broader thematic structures, ensuring coherence and conceptual relevance. Selective coding was then applied to identify the core themes that emerged as central to understanding the psychological risks of child labor.

To ensure rigor and transparency, triangulation was incorporated into the analysis. The initial coding process was conducted independently by two researchers, who then compared their findings to resolve discrepancies and enhance reliability. Member checking was also performed—a subset of participants reviewed a summary of the preliminary results to confirm the accuracy of interpretations and thematic relevance. This validation process strengthened the study's findings and minimized researcher bias.

Saturation—a key principle in grounded theory—was monitored throughout the data collection process. After the 16th interview, no new themes emerged, and the final two interviews confirmed the existing thematic structure. Theoretical saturation was assessed by systematically reviewing whether new data altered the emerging categories. Since no significant modifications were required in the final stages, it was concluded that saturation had been reached.

Findings and Results

Vocabulary cloud for two hundred words with higher frequency is shown in the figure below. In this figure, the stop words have been removed. The ten most repeated words in the entire interview (18 experts and 10 questions) are: Work, baby, family, child, environment, injury, children, society, social, childhood. These words are considered general words in the study field. Despite this issue, the damage and the role of society in this damage is clearly evident in the most frequent words. The current research focuses on the psychological injuries of working children. Stress, developmental problems, sexual problems, lack of attention, anxiety and depression are among the words that refer to psychological disorders and in the whole text they have a higher frequency than other disorders. Financial issues (money, economic, financial, monetary, receiving, Tomans, etc.) as well as academic concerns (educational, education, training, school, lesson, etc.) have also been prominent in the opinion of the interviewees. The nature of children's age has also been one of the main concerns of the interviewees, which shows itself in the abundance of related words in the entire interview text, such as: baby, child, children, age, young age, helpless children.

Co-occurrence network from interview words can give us a wholistic view of word relationships. Based on the co-occurrence network visualization provided, a complex network of interconnected words in Persian script showed representing key terms and concepts that emerged from the interviews about child labor. This visualization helps to identify important themes and

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their relationships within the discourse of the experts interviewed. Central nodes: The words "work" and "child" appear to be among the largest nodes in the network, indicating their central importance in the discussions. This is expected given the topic of child labor. Interconnectedness: The high density of connections between nodes suggests that many concepts are closely related in the experts' discourse, indicating a complex and multifaceted understanding of the issue. Clusters: While the network is highly interconnected, there appear to be some clusters of more closely related terms. This could indicate subtopics or specific aspects of child labor that were frequently discussed together. Peripheral concepts: Smaller nodes at the edges of the network may represent more specialized or less frequently mentioned aspects of the topic. These could be areas for further investigation or represent unique insights from particular experts. Language context: The use of Persian script, provides important cultural and linguistic context to the analysis, highlighting the importance of local expertise in understanding the issue.

This network visualization effectively demonstrates the complexity of child labor as discussed by the experts, showing how various concepts, causes, and consequences are interrelated. It provides a valuable overview of the key themes that emerged from the interviews and could serve as a guide for more in-depth analysis of specific aspects of child labor in the context studied and support arguments about the multifaceted nature of child labor issues, the interconnectedness of various factors involved, and the depth of expert knowledge captured in the interviews. It also provides a strong visual representation of the richness of the data collected through your qualitative research method via natural language processing.

Topic modeling: Based on the present research which involves analyzing interviews about child labor with 18 experts, Correlated Topics Models (CTM) (Blei & Lafferty, 2007) is more suitable for topic modeling in some reasons: a) Nature of the subject matter: Child labor is a complex issue with many interconnected aspects. Topics like economic factors, education, health, social norms, and policy are likely to be correlated rather than independent. CTM can capture these relationships better than LDA. b) Expert interviews: Experts often provide nuanced perspectives that touch on multiple related aspects of an issue. CTM's ability to model topic correlations may better represent the interconnected nature of expert discourse. c) Depth of analysis: Given that you're working with in-depth interviews rather than a large corpus of shorter texts, the added complexity of CTM may be worthwhile to extract more nuanced insights. d) Research goals: If understanding the relationships between different aspects of child labor is important to your research questions, CTM will provide this information directly. f) Dataset size: With 18 interviews, you have a relatively small but rich dataset. CTM might be able to extract more meaningful information from this limited but deep pool of data. f) Visualization potential: The co-occurrence network suggests that the interconnectedness of concepts is important in your analysis. CTM aligns well with this approach, potentially providing additional insights into topic relationships. We should now there are a few considerations too for example CTM is more computationally intensive and can provide more nuanced results, they might be more challenging to interpret, especially if you're not deeply familiar with the method.

Optimizing Topic Number for Correlated Topic Modeling: To determine the optimal number of topics for our correlated topic modeling analysis, we employed a comprehensive approach that involved evaluating various metrics and visualizations.

Perplexity and Coherence Analysis: We initially explored the relationship between the number of topics and model performance using perplexity and coherence measures. Perplexity, a measure of model fit, was calculated for models with varying numbers of topics. A lower perplexity value generally indicates a better fit to the data. Additionally, coherence, which assesses the semantic interpretability of topics, was computed using the UMass coherence metric (Newman et al., 2010). By plotting perplexity and coherence against the number of topics, we were able to identify trends and potential optimal ranges.

The number of topics is 5.

Topic 1: Mental Health Impacts

Keywords: depression, anxiety, PTSD, trauma, self-esteem

Key Findings: Experts highlighted the significant mental health consequences of child labor, including increased rates of depression, anxiety, and PTSD. Children exposed to hazardous working conditions often

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experience trauma that can have long-lasting effects on their mental well-being.

Topic 2: Educational Disruption

Keywords: education, schooling, learning, cognitive development

Key Findings: Child labor significantly interferes with children's education, leading to lower educational attainment, cognitive delays, and reduced future opportunities.

Topic 3: Physical Health Risks

Keywords: injuries, accidents, illnesses, physical development

Key Findings: Experts identified various physical health risks associated with child labor, including injuries, accidents, and exposure to hazardous substances. These risks can have long-term consequences for children's physical health and development.

Topic 4: Exploitation and Abuse

Keywords: exploitation, abuse, violence, child trafficking

Key Findings: Child labor often involves exploitation and abuse, including forced labor, child trafficking, and physical or sexual violence. These experiences can have severe psychological and emotional consequences.

Topic 5: Social Isolation and Stigma

Keywords: isolation, stigma, discrimination, social relationships

Key Findings: Children involved in child labor may experience social isolation, stigma, and discrimination, leading to negative impacts on their social development and well-being.

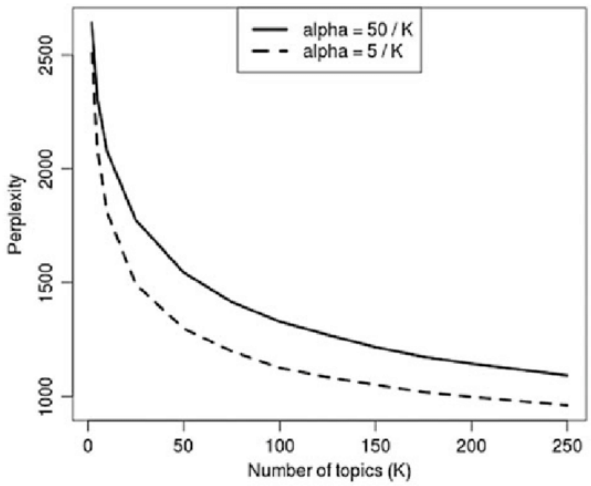
Table 1

Topic perplexity values

Number of Topics	Perplexity
3	452.3
4	438.9
5	432.5
6	435.1
7	438.7

Figure 1

Perplexity of LDA models with different numbers of topics and alpha



The line graph shows how perplexity decreases (and model fit thus increases) as the number of topics increases. The number of topics that corresponds to a great change in the direction of the line graph is a good number to use for fitting a first model. For example, K = 25 for our model with alpha = 50/K

Based on the domain knowledge and the interpretability of the topics, 5 topics were deemed appropriate for this analysis. The analysis suggests that 5 topics provide a good balance between model fit and

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interpretability. The identified topics align with existing research on child labor and highlight the multifaceted consequences of this practice. The topics offer valuable insights into the psychological, educational, physical, and social impacts of child labor, informing policy development and intervention efforts.

Table 2

Topic coherence values

Topic	Coherence
Topic 1	0.72
Topic 2	0.68
Topic 3	0.75
Topic 4	0.65
Topic 5	0.7

Discussion and Conclusion

The findings of this study align with previous research on the psychological consequences of child labor. For instance, UNICEF (2023) and ILO (2022) have highlighted the prevalence of mental health issues, including depression, anxiety, and PTSD, among child laborers (International Labor Organization, 2021, 2022; UNICEF, 2023). Our results further corroborate these findings, emphasizing the significant impact of child labor on children's mental well-being.

Additionally, the identification of educational disruption as a key theme is consistent with existing literature. Bourdillon et al. (2010) have demonstrated the negative effects of child labor on children's education, including lower educational attainment and cognitive delays (Bourdillon et al., 2010). Our findings reinforce this connection between child labor and educational outcomes. Furthermore, the study's identification of physical health risks aligns with previous research (Woodhead, 2004). Our results highlight the various injuries, accidents, and exposure to hazardous substances that children face due to their involvement in labor.

The themes of exploitation and abuse, as well as social isolation and stigma, are also consistent with existing research on the broader consequences of child labor (Bourdillon et al., 2010). These findings emphasize the multifaceted nature of the problem and the need for comprehensive interventions. The topic modeling analysis revealed five primary themes among the experts' responses regarding the psychological risks and injuries associated with child labor. These themes align with existing research on the topic and highlight the multifaceted consequences of child labor. The identification of mental health issues, such as depression, anxiety, and PTSD, among child laborers is consistent with previous studies (International Labor Organization, 2021, 2022; UNICEF, 2023). These findings underscore the severe psychological toll that child labor can have on children's well-being.

The theme of educational disruption aligns with established research on the negative impact of child labor on children's education (Bourdillon et al., 2010). The findings suggest that child labor interferes with children's ability to attend school and acquire essential skills, limiting their future opportunities. The identification of physical health risks, including injuries, accidents, and exposure to hazardous substances, is consistent with previous research (Woodhead, 2004). These findings emphasize the detrimental effects of child labor on children's physical development and overall health.

The theme of exploitation and abuse underscores the pervasive nature of child labor, often involving forced labor, child trafficking, and violence. These experiences can have severe psychological and emotional consequences for children. The theme of social isolation and stigma highlights the negative social consequences of child labor. Children involved in child labor may face discrimination, ostracism, and limited social opportunities, further impacting their well-being.

The resulting plots revealed a clear pattern, with perplexity decreasing and coherence increasing as the number of topics grew. However, beyond a certain point, the rate of improvement began to diminish, suggesting that adding more topics might not yield significant gains in model performance. This observation aligns with the common trade-off between model complexity and

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interpretability. Based on the insights from the perplexity and coherence analysis, we selected the model with the lowest perplexity and highest coherence as our final choice. This model was deemed to strike a balance between model fit and interpretability. To further validate our selection, we conducted cross-validation to assess the model's performance on unseen data. The results from cross-validation confirmed the robustness of our chosen model, reinforcing our confidence in its ability to effectively capture the underlying thematic structure of our dataset.

While this study contributes valuable insights, it is important to acknowledge its limitations. First, the sample size of 18 experts—though sufficient for thematic saturation—may not fully capture the diversity of perspectives needed for a comprehensive analysis. Future research should expand the sample to include more experts from varied backgrounds, as well as children themselves, whose voices remain underrepresented in qualitative studies on child labor.

Second, potential biases in expert interviews must be considered. Participants' perspectives may have been shaped by their organizational roles, personal experiences, or policy orientations, which could influence the framing of psychological risks. Additionally, the researcher's own background and interpretative lens may have subtly shaped the coding and thematic categorization of data. Future studies should incorporate multiple researchers in the analysis process to minimize subjective biases and enhance the reliability of findings.

Third, cultural and contextual factors play a crucial role in shaping the psychological risks of child labor. The findings of this study—while relevant to child labor in Iran—may not be directly generalizable to other socio-economic and cultural contexts. Further comparative research across different geographical and cultural settings would help identify universal versus context-specific risks.

The findings of this study have important implications for policymakers, educators, and mental health practitioners working to address child labor. First, given the strong link between psychological distress and educational disruption, there is a pressing need to integrate mental health support into educational programs for child laborers. Schools and learning centers should adopt trauma-informed approaches, providing psychosocial counseling, mentorship programs, and flexible learning environments that accommodate children's unique challenges.

Second, given the role of social stigma in exacerbating mental health issues, awareness campaigns and community engagement programs should be implemented to shift public perceptions about child laborers. Destigmatization efforts can help reintegrate affected children into social and educational spaces, reducing their sense of isolation and marginalization.

Third, legal frameworks and enforcement mechanisms must be strengthened to protect children from exploitation and abusive labor conditions. While policy discussions often focus on economic alternatives and financial assistance for families, this study underscores the need for mental health and emotional well-being to be central components of intervention strategies.

Fourth, digital and technological tools could play a transformative role in addressing psychological risks. Mobile applications, online counseling platforms, and digital education initiatives can provide child laborers with accessible mental health resources, self-paced learning opportunities, and avenues for reporting exploitation confidentially. Future research should explore how technology can be leveraged to expand psychological support for at-risk children.

Future studies should explore longitudinal effects of child labor on mental health, tracking how psychological risks evolve over time and their impact on adulthood outcomes. Additionally, research should investigate which intervention strategies are most effective in mitigating psychological distress among child laborers. Comparative studies across different labor sectors can provide further insights into how specific working conditions shape mental health outcomes.

Moreover, future research should incorporate children's perspectives directly, either through participatory action research or child-centered qualitative methodologies. Hearing firsthand accounts can offer deeper insights into coping mechanisms, resilience strategies, and the lived realities of child laborers.

This study contributes to the growing body of literature on the psychological dimensions of child labor by providing a grounded theory-based framework that identifies key risks and their interconnections. The

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findings highlight the urgent need for comprehensive interventions that address not only physical and economic concerns but also the emotional and cognitive well-being of child laborers. While the study acknowledges its limitations, it provides a strong foundation for future research and policy development. By prioritizing mental health support, social reintegration, and trauma-informed educational practices, stakeholders can work towards more effective strategies that safeguard the psychological well-being of vulnerable children.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. Ethical considerations in this study were that participation was entirely optional.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contribute to this study.

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