

Effectiveness of a Cyberspace-Based Parenting Model on Parenting Stress and Children's Externalizing Problems

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ABSTRACT

The present study aimed to determine the effectiveness of a cyberspace-based parenting model in reducing parenting stress and externalizing problems among primary-school boys. This quasi-experimental study employed a pretest-posttest design with a control group and a one-month follow-up. The participants were 30 mothers of boys aged 8-10 years enrolled in the first three grades of a primary school in Isfahan, Iran, whose children had been identified as exhibiting externalizing behavior problems. Participants were assigned to intervention and control groups, with 15 mothers in each group. The intervention group received an eight-session cyberspace-based parenting program, with each weekly session lasting 90 minutes, whereas the control group received no corresponding intervention. Parenting stress was assessed using the Parenting Stress Index-Short Form, and children's externalizing problems were measured using the parent-report Child Behavior Checklist. Data were analyzed using repeated-measures analysis of variance and Bonferroni-adjusted pairwise comparisons in SPSS version 22. Repeated-measures analysis showed a significant Time $\times$ Group interaction for total externalizing problems, $F(1.332, 37.300) = 59.096$, $p < 0.001$, partial $\eta^2 = 0.679$. Significant interaction effects were also found for rule-breaking behavior, $F(2, 56) = 27.960$, $p < 0.001$, partial $\eta^2 = 0.500$, and aggressive behavior, $F(1.630, 45.660) = 39.450$, $p < 0.001$, partial $\eta^2 = 0.580$. Parenting stress also showed a significant Time $\times$ Group interaction, $F(1.193, 33.391) = 22.983$, $p < 0.001$, partial $\eta^2 = 0.451$. Significant interactions were observed for parental distress, $F(2, 56) = 34.370$, $p < 0.001$, partial $\eta^2 = 0.551$, and difficult child, $F(1.601, 44.829) = 33.037$, $p < 0.001$, partial $\eta^2 = 0.541$, whereas dysfunctional parent-child interaction was not significant, $p = 0.054$. The cyberspace-based parenting model was effective in reducing children's externalizing problems and maternal parenting stress, with improvements maintained at one-month follow-up, indicating its potential usefulness in school- and family-based parenting interventions.

Keywords: Cyberspace, Digital Parenting, Parenting Stress, Externalizing Problems, Aggressive Behavior, Rule-Breaking Behavior.

1. Introduction

The rapid expansion of digital technologies has fundamentally transformed the environments in which children grow, learn, communicate, and develop. Smartphones, tablets, social networking platforms, online games, video-sharing services, and other forms of digital media have become embedded in everyday family life, creating both developmental opportunities and new parenting challenges. Children are increasingly exposed to cyberspace at younger ages and for longer periods, while parents are required to manage issues that previous generations encountered to a much lesser extent, including screen-time regulation, exposure to inappropriate content, online safety, privacy, digital communication, gaming, social media participation, and the balance between online and offline activities. Consequently, parenting in the contemporary digital environment involves not only traditional responsibilities related to supervision, emotional support, discipline, and socialization but also the management of children's interactions with rapidly evolving technological environments. This transformation has led to increasing scholarly attention to the concept of digital parenting and to the ways in which parents can support children's healthy engagement with technology while minimizing developmental and behavioral risks (Livingstone & Blum-Ross, 2020; Nichols & Selim, 2022).

The concept of digital parenting refers broadly to the beliefs, strategies, behaviors, competencies, and forms of mediation through which parents guide children's use of digital technologies. Although parental mediation was originally investigated in relation to television viewing, the concept has progressively expanded in response to the interactive, personalized, networked, and portable nature of contemporary digital media. Early work on parental mediation distinguished among instructive mediation, restrictive mediation, and social co-viewing, thereby providing a conceptual foundation for understanding how parents may influence children's media experiences through discussion, rule-setting, and shared use (Valkenburg et al., 1999). However, the current digital environment is considerably more complex than traditional television because children are not merely passive recipients of content; rather, they communicate, create, share, search, play, purchase, interact with algorithms, and participate in social networks. Accordingly, parental mediation in the digital age requires a more flexible and context-sensitive framework that takes account of technological affordances,

family relationships, parental values, and children's developmental autonomy (Clark, 2011).

More recent conceptualizations have emphasized that digital parenting encompasses a multidimensional set of practices rather than a single restrictive or supervisory behavior. Parents may employ active mediation by discussing online experiences and helping children interpret digital content; restrictive mediation by establishing rules concerning duration, content, or access; co-use by participating in digital activities together; technical mediation through monitoring tools and parental controls; and enabling mediation aimed at supporting children's digital skills and independent risk management. Systematic reviews have shown considerable variation in how digital parenting has been defined and measured, reflecting the complexity of family technology practices and the need for theoretically coherent intervention models (Modecki et al., 2022). Contemporary studies also indicate that parental mediation practices tend to cluster into broader styles rather than operating independently. These styles may differ in the degree of parental involvement, restrictiveness, communication, autonomy support, and technological competence, suggesting that successful digital parenting depends not simply on imposing more rules but on achieving an appropriate balance between protection, guidance, responsiveness, and the gradual transfer of responsibility to the child (Navarro & Jensen, 2026).

The need for such an integrated approach is particularly important because exposure to digital media may be associated with children's emotional and behavioral adjustment. Among the outcomes of concern are externalizing problems, a broad category that typically includes aggression, oppositionality, impulsive behavior, noncompliance, rule-breaking, and other forms of behavior directed outward toward the social environment. Externalizing difficulties during childhood are clinically and developmentally important because persistent patterns may interfere with family functioning, academic adjustment, peer relationships, and later psychosocial development. The relationship between digital-media exposure and behavioral difficulties is complex and likely influenced by multiple factors, including age, type of media use, duration of exposure, content, family context, parenting practices, and preexisting child characteristics. Nevertheless, a systematic review and meta-analysis of children aged 12 years or younger found that higher levels of screen time were associated with greater internalizing and externalizing behavior problems, supporting the need to examine not only

the amount of children's digital exposure but also the family processes through which such exposure is managed (Eirich et al., 2022).

Digital media may contribute to externalizing difficulties through several pathways. Excessive or poorly regulated screen use may displace sleep, physical activity, direct social interaction, and structured family routines. Exposure to highly stimulating or inappropriate content may contribute to emotional dysregulation, irritability, or aggressive modeling, while abrupt removal of devices can generate conflict when children have not developed adequate self-control or when family rules are inconsistent. Conversely, effective parental mediation may help children develop more adaptive habits, understand boundaries, regulate immediate rewards, evaluate content critically, and integrate digital activities within a broader pattern of healthy development. The effectiveness of parental mediation, however, depends not only on the existence of rules but also on the relational climate in which those rules are implemented. A highly coercive or punitive approach may provoke resistance and escalation, whereas consistent limits accompanied by explanation, warmth, and developmentally appropriate participation may be more likely to support behavioral regulation.

This issue is particularly relevant in light of evidence linking harsh parenting practices to child externalizing symptoms. Parenting characterized by excessive punishment, hostility, coercion, and psychological or physical harshness has been repeatedly associated with greater behavioral and emotional problems in children. A meta-analysis examining cultural variation in the relationship between harsh parenting and child outcomes demonstrated that harsh parenting was associated with both internalizing and externalizing symptoms across cultural contexts, even though the magnitude and interpretation of these associations may vary across societies (Pinquart, 2021). These findings suggest that intervention programs designed to address children's externalizing behaviors should not focus solely on controlling the child's digital behavior but should also modify the manner in which parents respond to conflict, noncompliance, aggression, and rule violations. In the context of cyberspace, this may include replacing reactive punishment and inconsistent restriction with predictable rules, logical consequences, positive reinforcement, collaborative problem-solving, and calm parental responses.

At the same time, child behavioral difficulties can themselves constitute an important source of parental strain.

Parenting stress refers to the psychological distress that arises when the perceived demands associated with the parenting role exceed available personal, relational, or environmental resources. It may include feelings of exhaustion, frustration, incompetence, emotional overload, dissatisfaction with parent-child interactions, and perceptions of the child as especially difficult to manage. Parenting stress is not determined by a single factor but instead emerges through interactions among parent characteristics, child characteristics, family relationships, and broader contextual pressures. A systematic review of parent, child, and situational correlates of parenting stress demonstrated that parenting stress is associated with a wide range of factors, including child behavioral and emotional difficulties, parental mental health, family circumstances, and social and environmental conditions (Fang et al., 2024). Thus, when a child displays repeated aggression, rule-breaking, conflict around technology use, or difficulty accepting restrictions, parental stress may increase substantially.

The relationship between parenting stress and child externalizing behavior may also be reciprocal. Difficult child behavior can elevate parental stress, while highly stressed parents may become more inconsistent, reactive, irritable, or coercive in their responses, thereby increasing the likelihood of further behavioral escalation. This reciprocal process may be particularly pronounced when technology use becomes a recurrent source of family conflict. Parents may struggle with uncertainty regarding appropriate screen-time limits, fears about harmful content, disagreement between caregivers, difficulties monitoring increasingly private digital activities, and resistance from children when restrictions are imposed. These demands can transform everyday digital management into a repeated source of conflict and burden. The Parenting Stress Index-Short Form has been widely used to assess dimensions such as parental distress, dysfunctional parent-child interaction, and perceptions of the child as difficult, and evidence from Iranian samples has supported the validity and reliability of this instrument for evaluating parenting-related stress (Shirzadi et al., 2014).

The digital behavior of parents themselves must also be considered. Parenting in cyberspace is not limited to regulating children's technology use because parents act as behavioral models whose own digital habits shape family norms. When parents frequently interrupt face-to-face interaction to attend to smartphones or other devices, opportunities for responsive communication and shared

attention may be reduced. Research on parental “technoference,” referring to everyday interruptions in parent-child interaction caused by technology, has found associations between parental technology-related distraction and child behavior problems (McDaniel & Radesky, 2018). Similarly, maternal mobile-phone use during direct interaction with children has been shown to interfere with processes involved in establishing joint attention, an important component of responsive parent-child engagement (Krapf-Bar et al., 2022). These findings indicate that effective digital parenting should include parental self-monitoring and modeling rather than focusing exclusively on controlling children’s behavior.

Parental digital mediation is also influenced by parents’ perceptions of online risk, their own digital competencies, and previous experiences with technology. Parents who perceive online environments as highly threatening may rely excessively on restriction, whereas those with stronger digital skills may be better positioned to combine supervision with active guidance and enabling practices. Research examining parental mediation of online risks has demonstrated that parents’ risk perceptions, digital skills, and experiences with online risk contribute to differences in the mediation strategies they employ (Helsper et al., 2024). This is important because effective intervention should not simply tell parents to monitor more; it should increase their understanding of digital environments, improve their capacity to distinguish realistic risks from generalized fear, and equip them with practical strategies for discussing content, privacy, safety, and online behavior with their children.

Socioeconomic and educational resources may further shape families’ readiness to engage in digital parenting. Differences in access to technological knowledge, social resources, educational capital, confidence, and digital literacy can create substantial inequalities in parents’ ability to guide children effectively. The concept of digital parenting readiness emphasizes that mediation practices are partly conditioned by parents’ available forms of capital and their capacity to understand and respond to digital challenges. Research on digital parenting divides has shown that parental capital is associated with differences in digital parenting readiness and mediation practices, suggesting that interventions should provide concrete and accessible competencies rather than assuming equal levels of technological knowledge across families (Zhao et al., 2023). For this reason, structured parenting programs may be particularly valuable because they can translate abstract

recommendations about digital safety into practical behaviors that parents can apply consistently in everyday family life.

Recent evidence also indicates that digital parenting is meaningfully associated with children’s digital wellbeing. A meta-analysis of associations between digital parenting and children’s digital wellbeing found that different forms of parental involvement, mediation, support, and restriction can be related to children’s online experiences and adjustment, although the direction and magnitude of associations vary according to the type of parental strategy and outcome examined (Tan et al., 2025). This variability highlights the limitations of interventions based solely on screen-time restriction. Restriction may be necessary in some circumstances, but without active communication, consistent modeling, emotional support, media literacy, and opportunities for children to develop internal self-regulation, restrictive strategies may have limited durability. A more comprehensive parenting model should therefore address both external control and the gradual development of children’s internal capacities for responsible digital behavior.

The contemporary literature increasingly portrays digital parenting as an adaptive family process situated between parental hopes and fears about technology. Parents may view digital media as a source of educational opportunities, creativity, social connection, and future competence while simultaneously worrying about addiction-like patterns of use, inappropriate content, privacy, cyberbullying, reduced physical activity, behavioral dysregulation, and weakening of family relationships. Livingstone and Blum-Ross have emphasized that parental responses to technology are shaped by these competing aspirations and concerns, with families attempting to reconcile children’s participation in an increasingly digital society with the desire to protect their wellbeing (Livingstone & Blum-Ross, 2020). Reviews of digitally mediated parenting likewise suggest that family technology practices are embedded in broader parenting values, relationship patterns, social contexts, and everyday negotiations rather than being reducible to simple technical control (Nichols & Selim, 2022).

These considerations suggest that interventions targeting cyberspace-related parenting should be multidimensional. Such programs may need to improve parental knowledge of children’s digital development, establish realistic and developmentally appropriate family rules, strengthen active and restrictive mediation skills, encourage constructive co-use, improve parents’ own digital modeling, reduce

technology-related disruptions to parent-child interaction, and teach strategies for managing aggression, resistance, and rule-breaking without escalating conflict. They may also need to strengthen children's responsibility and self-control indirectly through parenting practices, encourage media literacy and online-safety skills, and help families expand attractive offline activities and positive parent-child experiences. Importantly, the inclusion of parental emotion-regulation and stress-management strategies may reduce the likelihood that digital conflicts become embedded within coercive family interaction cycles.

Despite the expanding literature on parental mediation and digital parenting, several gaps remain. A substantial proportion of existing research has been correlational and has focused on describing parental mediation styles, screen-time practices, or associations between parental strategies and child outcomes. Although such research is valuable for identifying relevant relationships, it does not establish whether a structured parenting intervention can produce measurable reductions in both parental distress and children's behavioral problems. Moreover, many digital-parenting approaches emphasize technology management without integrating established principles of behavioral parenting, emotional regulation, parental modeling, parent-child communication, and family enrichment. The heterogeneity observed in definitions and measurements of digital parenting further reinforces the need for coherent intervention models that translate theoretical components into structured, teachable practices (Modecki et al., 2022; Navarro & Jensen, 2026).

The developmental period of middle childhood is particularly appropriate for such intervention because children are gaining increasing independence in their use of digital technologies while still remaining strongly influenced by parental regulation and modeling. During these years, patterns of aggression, noncompliance, rule-breaking, self-regulation, and family interaction may become increasingly consolidated. Early parental intervention may therefore offer an opportunity to modify both behavioral problems and the relational conditions that maintain them. An intervention capable of simultaneously reducing externalizing problems and parenting stress could be especially valuable because improvement in one domain may reinforce improvement in the other: reductions in child behavioral difficulties may decrease parental strain, while lower parental stress and more consistent parenting may promote further improvements in child behavior.

Accordingly, the aim of the present study was to determine the effectiveness of a cyberspace-based parenting model in reducing parenting stress and externalizing problems among primary-school boys.

2. Methods and Materials

2.1. Study Design and Participants

The present study employed a quasi-experimental pretest-posttest design with a control group and a one-month follow-up to examine the effectiveness of a cyberspace-based parenting model in reducing parenting stress and children's externalizing problems. The quantitative efficacy phase constituted part of a broader sequential exploratory study in which the intervention model had initially been developed through a qualitative phase and was subsequently evaluated quantitatively. Participants were selected purposively from an eligible school-based population and were allocated to intervention and control conditions. Outcome variables were assessed at three measurement occasions: before the intervention as the pretest, immediately after completion of the intervention as the posttest, and one month after the posttest as the follow-up assessment. Although the broader research project also investigated additional child-related outcomes, including impulsivity and delay of gratification, the present study focused specifically on parenting stress and children's externalizing problems. The statistical population consisted of mothers of boys enrolled in the first three grades of a boys' primary school in Isfahan, Iran, whose children had initially been identified by the school counselor as exhibiting externalizing behavioral problems. The broader developmental framework used to construct the intervention targeted children aged 8 to 12 years; however, children included in the quantitative efficacy phase were between 8 and 10 years of age. The mean age of children was 8.80 years ($SD = 0.77$) in the intervention group and 9.00 years ($SD = 0.84$) in the control group. Initially, 32 eligible mothers entered the quantitative phase, including 17 mothers assigned to the intervention group and 15 mothers assigned to the control group. Two participants in the intervention group withdrew before attending any intervention session and were therefore excluded from the final statistical analysis. Consequently, the final analyzed sample consisted of 30 mothers, with 15 participants in the intervention group and 15 in the control group. Regarding maternal education, 26.7% of mothers in the intervention group had a high-school diploma, 60.0% held a bachelor's degree, and 13.3% had postgraduate education; in the control group, the

corresponding proportions were 33.3%, 46.7%, and 20.0%, respectively. In terms of employment status, 10 mothers in the intervention group (66.7%) and seven mothers in the control group (46.7%) were homemakers. Eligibility criteria included having a son enrolled in one of the first three grades of primary school and within the target age range, the presence of externalizing behavioral problems based on the initial assessment of the school counselor, regular child use of cyberspace or digital media, residence in the study area, maternal willingness to participate in the research and attend intervention sessions regularly, absence of a reported serious psychiatric or physical condition in the mother that could interfere with participation, and lack of simultaneous participation in another related psychological or educational intervention. Exclusion criteria consisted of withdrawal of informed consent, substantial nonattendance or failure to participate effectively in intervention sessions, initiation of another related psychological or educational intervention during the study period, or the emergence of any condition that prevented continued participation in the research. Following identification of eligible families through the school counselor, mothers were informed about the study procedures and invited to participate. Both groups completed the baseline measures before commencement of the intervention. Mothers assigned to the intervention group subsequently participated in the cyberspace-based parenting program, whereas mothers in the control group received no corresponding training during the intervention period. Posttest measurements were administered immediately after completion of the intervention, and both groups were assessed again one month later for follow-up. Final analyses were conducted using data from the 30 mothers who completed the study requirements.

2.2. Instruments

Parenting Stress Index-Short Form. Parenting stress was measured using the Parenting Stress Index-Short Form (PSI-SF), developed by Abidin (1995) as a concise version of the original Parenting Stress Index for assessing stress associated with the parenting role and parent-child relationship. The instrument consists of 36 items distributed across three subscales, each containing 12 items. The Parental Distress subscale, comprising items 1 to 12, evaluates distress experienced by parents in relation to their parenting role and personal constraints associated with parenting. The Parent-Child Dysfunctional Interaction subscale, consisting of items 13 to 24, measures the extent

to which parents perceive interactions with their child as failing to meet their expectations or provide reinforcement. The Difficult Child subscale, comprising items 25 to 36, assesses parental perceptions of behavioral characteristics that make the child relatively difficult to manage. Items are rated on a Likert-type response scale, and item scores are summed to calculate the scores of the three subscales as well as an overall parenting-stress score. The total score ranges from 36 to 180, with higher scores representing higher levels of parenting stress and greater difficulties in the parent-child relationship. The PSI-SF has been extensively employed in clinical, developmental, and family research and has demonstrated acceptable psychometric properties. Evidence from Iranian psychometric investigations has supported the content, face, and criterion validity of the instrument. Shirzadi et al. (2014) reported Cronbach's alpha coefficients ranging from 0.59 to 0.86 for the total scale and its subscales, while 16-day test-retest reliability coefficients ranged from 0.92 to 0.97, indicating satisfactory internal consistency and excellent temporal stability for use among Iranian parents.

Child Behavior Checklist. Children's externalizing problems were evaluated using the parent-report form of the Child Behavior Checklist (CBCL), which forms part of the Achenbach System of Empirically Based Assessment developed by Achenbach (1991) and subsequently revised and standardized by Achenbach and Rescorla (2001). The parent-report CBCL contains 113 behavioral and emotional problem items that are rated by a parent or primary caregiver on a three-point response scale reflecting the extent to which each description applies to the child. The instrument provides scores for several syndrome scales and broader dimensions of emotional and behavioral functioning. In the present study, the Externalizing Problems dimension was used as the primary child behavioral outcome. This dimension is derived principally from the Rule-Breaking Behavior and Aggressive Behavior syndrome scales, and the sum of these subscale scores represents the overall level of externalizing problems. Higher scores indicate a greater frequency or severity of aggressive, oppositional, disruptive, or rule-breaking behaviors. The CBCL is one of the most widely used standardized instruments for assessing emotional and behavioral difficulties among children and adolescents and has demonstrated strong psychometric properties in different cultural and clinical populations. Reported psychometric findings for the parent-report form have indicated an overall internal-consistency coefficient of approximately 0.97 and a test-retest reliability coefficient of approximately 0.94. Iranian adaptation and validation

studies have similarly supported the applicability of the instrument, with internal-consistency coefficients for different CBCL scales ranging approximately from 0.63 to 0.95, together with satisfactory evidence of temporal stability, construct validity, and cross-informant reliability. In the present study, scores obtained from the Rule-Breaking Behavior and Aggressive Behavior subscales were combined to represent the child's overall externalizing-problems score.

2.3. Intervention

The cyberspace-based parenting intervention evaluated in the present study was developed during the qualitative phase of the broader sequential exploratory research project. The initial intervention framework was derived from conventional qualitative content analysis of relevant theoretical and empirical literature combined with semi-structured interviews conducted with parents of children aged 8 to 12 years. The qualitative synthesis resulted in the identification of five principal domains and 22 related subdomains considered relevant to effective parenting in the context of children's cyberspace and digital-media use. These qualitative findings were subsequently integrated with theoretical evidence, reviewed by the research supervisors and advisors, and subjected to expert appraisal to establish the conceptual relevance, clarity, comprehensiveness, and practical applicability of the proposed educational components. The finalized parenting package was delivered to mothers in the intervention group in eight weekly sessions, with each session lasting approximately 90 minutes. The intervention was implemented as an integrated parenting program rather than as a rigid sequence in which one conceptual domain was restricted to a single session. Across the eight sessions, mothers received education regarding characteristics of the digital generation, developmental differences in children's use of cyberspace, potential educational and social opportunities associated with digital technologies, and possible behavioral and psychological risks associated with inappropriate or excessive use. Particular emphasis was placed on fostering balanced and realistic parental attitudes toward cyberspace rather than exclusively restrictive or fear-based approaches. Mothers were trained to establish developmentally appropriate digital rules, regulate screen time, supervise online content, introduce gradual levels of digital access, formulate collaborative parent-child rules, and use predictable and logical consequences when agreements were

violated. The intervention also addressed different forms of parental digital mediation, including active mediation, restrictive mediation, parent-child co-use, technical monitoring, discussion of online content, and enhancement of communication regarding children's digital experiences. Considerable attention was devoted to parental modeling and behavioral consistency, including parents' own patterns of media use, avoidance of contradictory messages, maintenance of stable family rules, coordination between caregivers, and the contribution of fathers to consistent digital parenting. In relation to children's externalizing behaviors, mothers were trained to identify environmental and interpersonal triggers of aggression, defiance, and rule-breaking behavior, respond calmly and consistently to problematic behaviors, use positive reinforcement to strengthen adaptive behaviors, and avoid coercive or escalating interaction patterns. The program further incorporated strategies for developing children's self-control and responsibility, increasing tolerance for delayed rewards, encouraging internal behavioral control, and involving children in age-appropriate decision-making processes. Media-literacy and online-safety components included critical evaluation of digital content, recognition of inappropriate or potentially harmful material, protection of personal information and privacy, online safety skills, and development of internal judgment rather than exclusive dependence on external parental monitoring. Because the intervention also sought to reduce parenting stress, mothers were introduced to basic emotion-regulation and calming strategies, methods for reducing reactive responses during parent-child conflict, use of social and familial support resources, enhancement of positive parent-child interaction and quality time, development of attractive offline alternatives to screen use, family recreation, and environmental enrichment. Mothers in the control group did not receive the cyberspace-based parenting training during the intervention period. Assessments were administered to both groups before the intervention, immediately following completion of the eight sessions, and one month after the posttest assessment.

2.4. Data analysis

Statistical analyses were performed using IBM SPSS Statistics version 22. Descriptive statistics, including means and standard deviations, were calculated to summarize parenting stress and children's externalizing-problem scores across the pretest, posttest, and one-month follow-up

assessments for the intervention and control groups. Prior to conducting inferential analyses, the assumptions underlying repeated-measures analysis of variance were evaluated. The Shapiro-Wilk test was used to examine the normality of the distributions of the dependent variables, and Levene's test was applied to evaluate homogeneity of variances between the study groups at the relevant measurement occasions. Mauchly's test of sphericity was used to assess the assumption of equality of variances of the differences among repeated measurements. When Mauchly's test indicated a violation of the sphericity assumption, Greenhouse-Geisser-adjusted degrees of freedom and significance levels were used to obtain more robust estimates. Repeated-measures analysis of variance was subsequently conducted separately for parenting stress and children's externalizing problems to examine the effects of Time, Group, and the Time $\times$ Group interaction across the three assessment occasions. The main effect of Time represented overall changes in scores across pretest, posttest, and follow-up assessments, whereas the main effect of Group represented differences between the intervention and control groups irrespective of measurement occasion. The Time $\times$ Group interaction was regarded as the principal statistical indicator of intervention effectiveness because a significant interaction demonstrated that changes over time differed systematically between the intervention and control conditions. Partial eta squared (partial η^2) was calculated as the measure of effect size to estimate the magnitude of intervention-related effects, and observed statistical power was also reported where appropriate. When significant within-subject effects were identified, Bonferroni-adjusted pairwise comparisons were conducted

to determine the specific differences between pretest, posttest, and follow-up scores while controlling for inflation of the Type I error rate due to multiple comparisons. All statistical tests were two-tailed, and the level of statistical significance was set at $p < 0.05$.

3. Findings and Results

The final sample consisted of 30 mothers, with 15 participants in the intervention group and 15 participants in the control group. All participating mothers had sons aged 8 to 10 years who were enrolled in the first three grades of primary school and had been identified as exhibiting externalizing behavioral problems. The mean age of the children was 8.80 years ($SD = 0.77$) in the intervention group and 9.00 years ($SD = 0.84$) in the control group, indicating that the two groups were generally comparable in terms of child age. Regarding maternal educational level, 26.7% of mothers in the intervention group had a high-school diploma, 60.0% held a bachelor's degree, and 13.3% had postgraduate education. In the control group, 33.3% had a high-school diploma, 46.7% held a bachelor's degree, and 20.0% had postgraduate education. With respect to occupational status, 10 mothers in the intervention group (66.7%) and seven mothers in the control group (46.7%) were homemakers. Descriptive examination of the baseline scores indicated that the intervention group had a higher mean total externalizing-problems score than the control group at pretest (21.07 vs. 16.40), and this initial descriptive difference should be considered when interpreting the pattern of change over time.

Table 1

Means and Standard Deviations of Externalizing Problems, Parenting Stress, and Their Subscales Across Measurement Occasions

Outcome	Group	Pretest M (SD)	Posttest M (SD)	Follow-up M (SD)
Externalizing problems	Intervention	21.07 (5.94)	14.93 (3.63)	12.13 (3.15)
	Control	16.40 (4.06)	16.27 (3.67)	16.53 (3.29)
Rule-breaking behavior	Intervention	8.07 (2.84)	5.40 (1.80)	4.53 (1.54)
	Control	6.60 (1.68)	7.00 (1.73)	6.60 (1.59)
Aggressive behavior	Intervention	13.00 (3.60)	11.40 (3.55)	7.80 (1.85)
	Control	9.80 (2.78)	9.53 (2.35)	9.93 (1.94)
Parenting stress	Intervention	98.53 (19.94)	84.87 (16.66)	80.40 (15.90)
	Control	92.53 (18.42)	94.20 (16.57)	94.33 (18.31)
Parental distress	Intervention	33.53 (1.60)	29.86 (1.51)	28.46 (1.65)
	Control	31.93 (1.60)	31.86 (1.51)	32.80 (1.65)
Dysfunctional parent-child interaction	Intervention	33.53 (2.66)	27.66 (1.33)	26.73 (1.44)
	Control	31.33 (4.76)	31.66 (2.66)	32.60 (1.33)
Difficult child	Intervention	31.46 (2.06)	27.33 (2.07)	25.53 (1.88)
	Control	29.00 (2.07)	30.66 (2.12)	30.53 (1.68)

As shown in Table 1, a clear downward pattern was observed in the intervention group for both primary outcomes across the three measurement occasions. The mean total externalizing-problems score decreased from 21.07 (SD = 5.94) at pretest to 14.93 (SD = 3.63) at posttest and further to 12.13 (SD = 3.15) at the one-month follow-up. In contrast, the control-group scores remained relatively stable, changing only from 16.40 (SD = 4.06) at pretest to 16.27 (SD = 3.67) at posttest and 16.53 (SD = 3.29) at follow-up. The same general pattern was evident for the externalizing-problem subscales. Rule-breaking behavior in the intervention group declined from 8.07 (SD = 2.84) to 5.40 (SD = 1.80) and subsequently to 4.53 (SD = 1.54), whereas control-group means remained close to their initial level. Aggressive behavior also decreased in the intervention group from 13.00 (SD = 3.60) at pretest to 11.40 (SD = 3.55) at posttest and 7.80 (SD = 1.85) at follow-up, while no comparable decline occurred in the control group. Parenting stress demonstrated a similar pattern: the intervention-group mean decreased from 98.53 (SD = 19.94) at pretest to 84.87 (SD = 16.66) at posttest and 80.40 (SD = 15.90) at follow-up, whereas the corresponding control-group means were 92.53 (SD = 18.42), 94.20 (SD = 16.57), and 94.33 (SD = 18.31), respectively. Reductions were likewise evident in the intervention group for parental distress, dysfunctional parent-child interaction, and difficult-child scores. Overall, the descriptive results indicated progressive improvement in the intervention group from pretest through follow-up, whereas the control group displayed comparatively limited change.

Before conducting the repeated-measures analysis of variance, the assumptions of normality, homogeneity of error variances, and sphericity were examined. For total parenting stress, Shapiro-Wilk tests were nonsignificant at all three measurement occasions in both groups, with p

values ranging from 0.68 to 0.89, indicating that the assumption of approximate normality was adequately satisfied. For total externalizing problems, however, normality was not fully supported at all measurement occasions. Significant Shapiro-Wilk tests were obtained for the control group at pretest ($W = 0.78$, $p = 0.002$), the control group at posttest ($W = 0.86$, $p = 0.029$), and the intervention group at follow-up ($W = 0.86$, $p = 0.029$). Given the relatively limited nature of these departures and the robustness of repeated-measures F tests to moderate violations of normality, particularly with equally sized groups, the planned parametric analyses were retained, although this deviation was considered when interpreting the findings. Levene's tests were nonsignificant for both primary outcomes at all three measurement occasions. For externalizing problems, Levene's F values ranged from 0.03 to 1.13, with p values ranging from 0.29 to 0.78, whereas for parenting stress, F values ranged from 0.00 to 0.16, with p values ranging from 0.68 to 0.94. These findings supported the assumption of homogeneity of error variances. Mauchly's test demonstrated that the sphericity assumption was violated for total externalizing problems, $W = 0.49$, $\chi^2(2) = 18.78$, $p < 0.001$, and total parenting stress, $W = 0.32$, $\chi^2(2) = 30.12$, $p < 0.001$; consequently, Greenhouse-Geisser-corrected degrees of freedom were used for these analyses. For the externalizing-problem subscales, sphericity was satisfied for rule-breaking behavior ($W = 0.83$, $p = 0.09$) but violated for aggressive behavior ($W = 0.77$, $p = 0.03$). Regarding the parenting-stress subscales, the assumption was satisfied for parental distress ($W = 0.878$, $p = 0.173$), whereas violations were observed for dysfunctional parent-child interaction ($W = 0.090$, $p < 0.001$) and difficult child ($W = 0.751$, $p = 0.021$). Accordingly, Greenhouse-Geisser corrections were applied whenever the sphericity assumption was violated.

Table 2

Repeated-Measures Analysis of Variance for Externalizing Problems, Parenting Stress, and Their Subscales

Outcome	Effect	df1	df2	F	p	Partial η^2	Power
Externalizing problems	Time	1.332	37.300	57.021	<0.001	0.671	1.000
	Time $\times$ Group	1.332	37.300	59.096	<0.001	0.679	1.000
Rule-breaking behavior	Time	2	56	24.320	<0.001	0.470	1.000
	Group	1	28	1.310	0.260	0.040	0.190
	Time $\times$ Group	2	56	27.960	<0.001	0.500	1.000
Aggressive behavior	Time	1.630	45.660	39.450	<0.001	0.580	1.000
	Group	1	28	0.250	0.610	0.009	0.070
	Time $\times$ Group	1.630	45.660	39.450	<0.001	0.580	1.000
Parenting stress	Time	1.193	33.391	15.104	0.001	0.350	0.980
	Group	1	28	0.350	0.550	0.012	0.080

	Time × Group	1.193	33.391	22.983	<0.001	0.451	0.999
Parental distress	Time	2	56	20.390	<0.001	0.421	1.000
	Group	1	28	0.510	0.481	0.018	0.106
	Time × Group	2	56	34.370	<0.001	0.551	1.000
Dysfunctional parent-child interaction	Time	1.047	29.317	2.271	0.142	0.075	0.314
	Group	1	28	1.517	0.228	0.051	0.221
	Time × Group	1.047	29.317	3.968	0.054	0.124	0.497
Difficult child	Time	1.601	44.829	10.460	<0.001	0.272	0.964
	Group	1	28	0.494	0.488	0.017	0.104
	Time × Group	1.601	44.829	33.037	<0.001	0.541	1.000

As presented in Table 2, repeated-measures analysis revealed a statistically significant effect of time on total externalizing problems, $F(1.332, 37.300) = 57.021$, $p < 0.001$, partial $\eta^2 = 0.671$, indicating substantial overall change across the three measurement occasions. More importantly, the Time × Group interaction was statistically significant, $F(1.332, 37.300) = 59.096$, $p < 0.001$, partial $\eta^2 = 0.679$, with observed power of 1.000. This interaction demonstrated that the pattern of change in externalizing problems differed markedly between the intervention and control groups. Consistent with the descriptive findings, the intervention group showed a progressive decline from a mean of 21.07 at pretest to 14.93 at posttest and 12.13 at follow-up, whereas the control-group means remained essentially unchanged. At the subscale level, the Time × Group interaction was significant for rule-breaking behavior, $F(2, 56) = 27.960$, $p < 0.001$, partial $\eta^2 = 0.500$, and aggressive behavior, $F(1.630, 45.660) = 39.450$, $p < 0.001$, partial $\eta^2 = 0.580$. The overall group main effects for rule-breaking behavior and aggression were not significant, indicating that the primary differences were associated with divergent patterns of change across time rather than a uniform difference between the groups across all measurement occasions. For total parenting stress, there was

a significant effect of time, $F(1.193, 33.391) = 15.104$, $p = 0.001$, partial $\eta^2 = 0.350$, as well as a significant Time × Group interaction, $F(1.193, 33.391) = 22.983$, $p < 0.001$, partial $\eta^2 = 0.451$, with observed power of 0.999. In contrast, the overall group main effect was not statistically significant, $F(1, 28) = 0.350$, $p = 0.550$, partial $\eta^2 = 0.012$. The intervention-group parenting-stress mean decreased from 98.53 at pretest to 84.87 at posttest and 80.40 at follow-up, whereas the control-group mean remained relatively stable and showed a slight descriptive increase from 92.53 to 94.20 and 94.33. Analysis of the parenting-stress subscales demonstrated significant Time × Group interactions for parental distress, $F(2, 56) = 34.370$, $p < 0.001$, partial $\eta^2 = 0.551$, and difficult child, $F(1.601, 44.829) = 33.037$, $p < 0.001$, partial $\eta^2 = 0.541$. However, the Time × Group interaction for dysfunctional parent-child interaction did not reach the conventional threshold for statistical significance, $F(1.047, 29.317) = 3.968$, $p = 0.054$, partial $\eta^2 = 0.124$. Thus, the strongest intervention-related changes within the parenting-stress dimensions were observed in mothers' parental distress and perceptions of their children as difficult, whereas the evidence for differential change in dysfunctional parent-child interaction was comparatively weaker.

Table 3

Bonferroni-Adjusted Pairwise Comparisons Across Measurement Occasions for the Primary Outcomes

Outcome	Comparison	Mean Difference	SE	p
Externalizing problems	Pretest vs. posttest	3.13	0.427	<0.001
	Pretest vs. follow-up	4.40	0.537	<0.001
	Posttest vs. follow-up	1.26	0.261	<0.001
Parenting stress	Pretest vs. posttest	6.00	1.814	0.008
	Pretest vs. follow-up	8.16	1.840	<0.001
	Posttest vs. follow-up	2.167	0.649	0.007

As shown in Table 3, Bonferroni-adjusted pairwise comparisons indicated statistically significant differences between all three measurement occasions for total externalizing problems. Externalizing-problem scores were

significantly lower at posttest than at pretest, with a mean difference of 3.13 ($SE = 0.427$, $p < 0.001$), and significantly lower at follow-up than at pretest, with a mean difference of 4.40 ($SE = 0.537$, $p < 0.001$). A statistically significant

difference was also observed between posttest and follow-up, with a mean difference of 1.26 ($SE = 0.261$, $p < 0.001$), indicating that changes in externalizing problems continued across the follow-up period when measurement occasions were considered overall. Similarly, parenting-stress scores differed significantly between pretest and posttest, with a mean difference of 6.00 ($SE = 1.814$, $p = 0.008$), and between pretest and follow-up, with a mean difference of 8.16 ($SE = 1.840$, $p < 0.001$). The posttest-to-follow-up comparison was also significant, with a mean difference of 2.167 ($SE = 0.649$, $p = 0.007$). At the subscale level, significant pretest-to-posttest and pretest-to-follow-up reductions were observed for rule-breaking behavior, aggressive behavior, parental distress, and difficult-child scores. However, the posttest-to-follow-up comparisons were not statistically significant for aggressive behavior ($p = 0.073$), parental distress ($p = 1.000$), or difficult-child scores ($p = 0.062$). This latter pattern indicates that, for these dimensions, the changes observed by the end of the intervention were generally maintained during the one-month follow-up rather than showing statistically significant additional change after completion of the intervention.

4. Discussion

The present study examined the effectiveness of a cyberspace-based parenting model in reducing parenting stress and children's externalizing problems among mothers of primary-school boys. The findings demonstrated that the intervention produced substantial improvements in both principal outcomes. Total externalizing problems showed a significant Time $\times$ Group interaction with a large effect size, indicating that changes across pretest, posttest, and follow-up differed markedly between the intervention and control groups. The intervention-group mean for externalizing problems declined from 21.07 at pretest to 14.93 at posttest and further to 12.13 at follow-up, whereas the control-group mean remained comparatively stable across the three measurement occasions. Similar patterns were observed for rule-breaking behavior and aggressive behavior, both of which showed significant Time $\times$ Group interactions and large effect sizes. Parenting stress also decreased substantially in the intervention group, falling from 98.53 at pretest to 84.87 at posttest and 80.40 at follow-up, while the control-group scores remained essentially unchanged. Significant intervention-related effects were particularly evident for parental distress and the difficult-child subscale, whereas the Time $\times$ Group interaction for dysfunctional

parent-child interaction did not reach the conventional level of statistical significance. Overall, the results indicate that the cyberspace-based parenting program was effective in reducing both mothers' parenting stress and their children's externalizing behavioral difficulties and that much of the observed improvement was maintained at the one-month follow-up.

The reduction in children's externalizing problems is consistent with the growing literature emphasizing the role of parenting practices in shaping children's behavioral adjustment in digital environments. Contemporary digital parenting involves considerably more than merely controlling the amount of time children spend using technological devices. It includes parental communication, monitoring, collaborative rule-setting, co-use, modeling, supervision of content, and the development of children's own digital judgment and self-regulatory capacities (Modecki et al., 2022; Nichols & Selim, 2022). The intervention used in the present study incorporated these multiple dimensions rather than relying exclusively on restrictive screen-time rules. This broader approach may explain why meaningful reductions were observed not only in overall externalizing problems but also in specific manifestations such as aggression and rule-breaking.

The finding is also compatible with the theoretical development of parental mediation research. Early parental mediation models distinguished between instructive mediation, restrictive mediation, and social co-viewing (Valkenburg et al., 1999). Subsequent work demonstrated that parenting in contemporary digital environments requires a more complex and relationally sensitive framework because children actively interact with digital platforms rather than merely receiving media content passively (Clark, 2011). The program evaluated in the current study incorporated active mediation, age-appropriate restriction, co-use, technical monitoring, parent-child dialogue, and gradual transfer of responsibility to the child. Such an integrated structure may have reduced externalizing behaviors by replacing inconsistent or reactive technology management with predictable expectations and clearer behavioral contingencies.

The observed decline in externalizing behavior is also aligned with evidence linking children's digital-media use to behavioral difficulties. Eirich et al. reported, in a systematic review and meta-analysis, that greater screen exposure among children aged 12 years or younger was associated with higher levels of internalizing and externalizing problems (Eirich et al., 2022). Although such evidence does

not establish a simple causal relationship between screen time and behavioral problems, it suggests that poorly regulated digital engagement may coexist with or contribute to broader difficulties in emotional and behavioral regulation. In the present study, the intervention did not merely seek to eliminate digital use but instead trained parents to manage screen time, content, routines, online safety, and alternative offline activities more systematically. This may have reduced conditions under which device-related conflict, immediate-reward seeking, and resistance to parental limits could reinforce aggressive or oppositional behavior.

The significant reduction in rule-breaking behavior may particularly reflect the program's emphasis on clear expectations, consistent rules, logical consequences, and child involvement in age-appropriate decision-making. When digital rules are ambiguous, change frequently, or differ between caregivers, children may test boundaries or resist restrictions. In contrast, predictable family rules may reduce uncertainty and opportunities for conflict. Recent research has increasingly conceptualized digital parental mediation as a set of broader styles characterized by different combinations of restrictiveness, involvement, communication, and autonomy support (Navarro & Jensen, 2026). From this perspective, the effectiveness of the present intervention may have resulted from combining boundaries with explanation and relational involvement rather than imposing restriction in isolation.

The reduction in aggressive behavior can also be understood through the intervention's behavioral-management component. Mothers were trained to identify triggers for aggression, respond calmly to conflict, avoid escalation, reinforce adaptive behavior, and maintain consistency in the face of noncompliance. These elements are important because coercive family interactions can intensify externalizing difficulties. The finding is consistent with evidence showing that harsh parenting is associated with higher levels of child externalizing symptoms across diverse cultural contexts (Pinquart, 2021). Although the present intervention was not designed specifically as a harsh-parenting intervention, its emphasis on calm responses, logical consequences, reinforcement, and emotional regulation may have reduced reactive or punitive interactions that could otherwise maintain aggressive behavior.

Another plausible mechanism involves parental modeling. The intervention explicitly addressed parents' own digital habits and the importance of consistency

between what parents expect from children and what they model themselves. Research on technofence has shown that parent distraction by technological devices is associated with child behavior problems (McDaniel & Radesky, 2018). Similarly, maternal mobile-phone use during parent-child interactions has been found to interfere with processes involved in establishing joint attention (Krapf-Bar et al., 2022). When parents frequently interrupt interaction to attend to devices while simultaneously demanding that children reduce screen use, contradictory family messages may emerge. By increasing mothers' awareness of their own digital behavior and encouraging more attentive parent-child interaction, the intervention may have reduced such inconsistencies and strengthened behavioral modeling.

The finding that parenting stress decreased significantly in the intervention group is also theoretically meaningful. Parenting stress reflects the extent to which the demands of the parenting role are experienced as exceeding available psychological, relational, and practical resources. It can emerge from parental distress, difficult child characteristics, strained parent-child interaction, or broader environmental pressures. Fang et al., in a systematic review, demonstrated that parenting stress is associated with multiple parent, child, and situational factors and that child behavioral difficulties constitute an important source of parenting burden (Fang et al., 2024). In the current study, mothers were parenting children already identified as exhibiting externalizing problems, and conflict around digital-media use likely represented an additional daily demand. The decline in parenting stress may therefore have resulted partly from improvement in child behavior and partly from increased parental confidence in managing digital challenges.

The significant reduction in parental distress specifically supports this interpretation. The intervention provided mothers with concrete strategies for managing children's online behavior, responding to conflict, establishing realistic expectations, regulating their own emotions, and creating structured alternatives to digital activity. Such skills may have increased perceived parenting efficacy and reduced feelings of helplessness or emotional overload. This interpretation is also consistent with the broader digital-parenting literature, which emphasizes that parents must negotiate competing hopes and fears regarding technology and often experience uncertainty about how much restriction, supervision, or autonomy is appropriate (Livingstone & Blum-Ross, 2020). A structured intervention may reduce this uncertainty by replacing generalized concern with specific, actionable strategies.

The decline in difficult-child scores was another notable finding. This subscale reflects parents' perceptions that their child is difficult to manage because of behavioral or regulatory characteristics. The large Time $\times$ Group effect suggests that mothers in the intervention condition came to perceive their children as less difficult over time. This may reflect genuine behavioral improvement, but it may also indicate a change in parental interpretation. As parents develop more effective strategies, child resistance may become more understandable and manageable, reducing the perception that problematic behavior is unpredictable or uncontrollable. Because parenting stress is influenced by both objective child behavior and parents' appraisal of that behavior, changes in knowledge and perceived competence may be especially important (Fang et al., 2024).

In contrast, the dysfunctional parent-child interaction subscale did not show a statistically significant Time $\times$ Group interaction at the conventional 0.05 level, although the effect size suggested some degree of differential change. This finding may indicate that relational aspects of parent-child functioning require more time to change than parental distress or perceptions of child difficulty. The intervention lasted eight sessions, and the follow-up period was only one month. Although mothers may rapidly acquire new strategies and observe behavioral improvement, deeper changes in reciprocal expectations, emotional closeness, and entrenched interaction patterns may require longer-term practice. It is also possible that the small sample reduced statistical power for detecting a more modest effect on this dimension.

The significant changes in parenting stress are also consistent with the psychometric conceptualization of parenting stress represented by the Parenting Stress Index-Short Form, which distinguishes parental distress, dysfunctional interaction, and difficult-child characteristics as related but distinct dimensions. Previous Iranian evaluation has supported the validity and reliability of the PSI-SF for examining these domains (Shirzadi et al., 2014). The present findings suggest that a digital-context parenting intervention may influence these dimensions differently, with more immediate effects on mothers' subjective distress and perceptions of child manageability than on the broader quality of parent-child interaction.

The present findings can further be interpreted within the framework of parental digital readiness. Parents differ substantially in their technological knowledge, perceived competence, available resources, and capacity to apply mediation strategies. Research has shown that parental

capital and digital parenting readiness are associated with differences in parental digital mediation (Zhao et al., 2023). The intervention may therefore have been effective because it provided participants with structured knowledge and practical competencies that reduced uncertainty and increased their ability to make informed decisions about digital access, supervision, and communication. Rather than assuming that parents already possessed sufficient digital skills, the program treated these skills as teachable parenting competencies.

The results are also consistent with evidence showing that parents' own risk perceptions, digital skills, and experiences influence how they mediate children's online risks (Helsper et al., 2024). Parents who lack digital confidence may either under-monitor because they feel unable to supervise effectively or over-restrict because avoidance seems safer than engagement. The intervention's emphasis on realistic, non-fear-based digital awareness may have helped mothers move toward more proportionate and context-sensitive mediation. This may have reduced unnecessary conflict while maintaining appropriate boundaries and safety practices.

Recent meta-analytic evidence also supports the relevance of digital parenting to children's digital wellbeing. Different parental mediation strategies have been found to relate differently to child outcomes, indicating that the quality and type of parental involvement matter rather than simply the presence of parental control (Tan et al., 2025). This reinforces the importance of the integrated structure of the present program. Restrictive strategies were combined with active communication, co-use, modeling, online-safety education, child responsibility, and emotional support. Such a multidimensional intervention is theoretically more likely to support lasting behavioral regulation than a narrow focus on limiting access alone.

The maintenance of improvement at follow-up also deserves attention. Total externalizing problems and parenting stress remained lower after the intervention, and for several subscales there was no significant deterioration between posttest and follow-up. This pattern suggests that mothers were able to continue applying at least some of the learned strategies after formal sessions ended. In some outcomes, descriptive improvement continued during the follow-up period, which may indicate that changes in family routines require time to consolidate. Consistent application of rules, calmer parental responses, greater attention to offline alternatives, and improved parent-child

communication may gradually influence behavior even after the educational sessions have concluded.

5. Conclusion

The findings of the present study indicate that the cyberspace-based parenting model was effective in reducing parenting stress and children's externalizing problems among mothers of primary-school boys, with substantial improvements observed in overall externalizing problems, rule-breaking behavior, aggressive behavior, parental distress, and perceptions of the child as difficult. The maintenance of these improvements at the one-month follow-up suggests that the intervention produced effects that extended beyond the immediate training period. By integrating digital parenting skills with consistent rule-setting, parental modeling, behavioral management, emotion-regulation strategies, media literacy, online safety, and family enrichment, the model provided parents with a comprehensive framework for managing children's digital-media use while simultaneously addressing broader behavioral and parenting challenges. Although changes in dysfunctional parent-child interaction were not statistically significant, the overall pattern of findings supports the potential value of this intervention as a structured approach for improving parental functioning and reducing children's externalizing difficulties in increasingly digital family environments.

The findings should nevertheless be interpreted cautiously in light of several limitations. The sample was small and included only 30 mothers of boys aged 8 to 10 years from a single school-based setting in Isfahan, which limits the generalizability of the results to fathers, girls, children of other ages, and families from different cultural, socioeconomic, or geographical backgrounds. Participants were selected purposively rather than through probability sampling, and the study used a quasi-experimental design rather than full randomized allocation. Baseline externalizing-problem scores were descriptively higher in the intervention group than in the control group, which represents an important initial imbalance when interpreting change. Some departures from normality were also observed for externalizing-problem scores. Furthermore, the principal outcomes relied on maternal report, raising the possibility of shared-method variance, expectancy effects, and response bias. The control group received no active comparison condition, and the one-month follow-up period was relatively short. Finally, the small sample may have limited

statistical power for detecting more modest changes, particularly in dysfunctional parent-child interaction.

Future studies should evaluate the cyberspace-based parenting model using larger and more diverse samples and, where feasible, randomized controlled designs. Research should include fathers as well as mothers, girls as well as boys, and children across different developmental stages to determine whether intervention effects vary according to child age, sex, family structure, socioeconomic status, or parental digital competence. Longer follow-up periods of three, six, or twelve months would help determine the durability of behavioral and parenting-stress changes. Future studies should also incorporate multiple informants, including fathers, teachers, and children, and include observational indicators of parent-child interaction and objective or device-based measures of digital-media use. Comparisons with active control conditions and established parenting interventions would clarify the specific added value of the cyberspace-based components. Mediation analyses could further examine whether changes in parental digital mediation, parenting self-efficacy, parental stress, consistency, or child self-regulation account for subsequent reductions in externalizing problems.

In practice, the findings support the use of structured cyberspace-based parenting education in schools, counseling centers, child and adolescent mental-health services, and family-support programs. Such interventions should move beyond simple recommendations to reduce screen time and should instead teach parents how to establish realistic rules, monitor content, communicate about online experiences, model balanced technology use, manage conflict calmly, reinforce adaptive behavior, and create appealing offline alternatives. Programs may be especially useful for families in which digital-media use has become a repeated source of conflict or where children show aggressive, oppositional, or rule-breaking behavior. School counselors and psychologists can also use the model as a preventive intervention for parents who feel uncertain or overwhelmed by digital parenting demands. Integrating digital literacy, behavioral parenting skills, parental emotion regulation, and family enrichment within a single program may provide a practical approach for simultaneously addressing child behavior and parental stress.

Authors' Contributions

Authors equally contributed to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

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Declaration of Interest

The authors report no conflict of interest.

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The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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