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Techno-Conference and Parenting Stress: Moderating and Mediating Effects of Working-From-Home, Responsiveness, and Marital Satisfaction

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ABSTRACT: The proliferation of digital technology in the domestic sphere has introduced "technoference"—the interruption and interference of technology use in interpersonal interactions—as a significant concern for family wellbeing. This quantitative study examines the relationship between technoference and parenting stress among Gen Z parents in Ghana, investigating the mediating roles of parental responsiveness and marital satisfaction, and the moderating role of work-from-home (WFH) arrangements. Using a cross-sectional survey design, data were collected from 420 parents (aged 22-35 years) through stratified random sampling across five regions in Ghana. Validated instruments measured technoference (Technoference Scale), parenting stress (Parenting Stress Index-Short Form), parental responsiveness (Responsiveness subscale of the Parenting Dimensions Inventory), marital satisfaction (Couples Satisfaction Index), and WFH status. Mediation analysis using PROCESS Macro (Model 4) with 5,000 bootstrap resamples revealed that technoference was positively associated with parenting stress ($\beta = 0.34$, $p < .001$). This relationship was partially mediated by parental responsiveness (indirect effect $\beta = 0.11$, 95% CI [0.07, 0.16]) and marital satisfaction (indirect effect $\beta = 0.09$, 95% CI [0.05, 0.13]). The serial mediation through responsiveness → marital satisfaction was also significant (indirect effect $\beta = 0.06$, 95% CI [0.03, 0.09]). Moderation analysis (PROCESS Model 1) revealed that WFH arrangements significantly moderated the technoference-parenting stress relationship (interaction $\beta = 0.19$, $p = .002$), with the association being stronger for parents working from home compared to those working outside the home. The findings extend the Technoference Framework and the Family Stress Model, providing culturally grounded insights for interventions targeting technology use in the domestic sphere. Implications for workplace policies, parenting programmes, and family therapy are discussed.

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KEYWORDS:
Technoference, parenting stress, work-from-home, parental responsiveness, marital satisfaction, Gen Z, Ghana, family technology, digital distraction

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I. INTRODUCTION

The integration of digital technology into daily life has transformed the domestic sphere in ways that were unimaginable a generation ago. Smartphones, tablets, laptops, and wearable devices have become ubiquitous, accompanying parents into every domain of family life—including the moments that matter most for child development and family wellbeing. This pervasive presence of technology has given rise to a phenomenon known as "technoference": the interference and interruption of technology use in interpersonal interactions and relationships (McDaniel & Coyne, 2016; McDaniel & Radesky, 2018a). Technoference occurs when technology competes for attention during face-to-face interactions, disrupting the quality, duration, and depth of human connection. For parents, technoference represents a unique challenge. The demands of parenting require sustained attention, emotional availability, and responsive engagement. When technology interrupts parent-child or parent-partner interactions, the quality of these relationships may suffer. Parenting stress—the aversive psychological reaction to the demands of parenting (Abidin, 1995)—may be intensified by the constant pull of digital distraction. Yet, the mechanisms through which technoference translates into parenting stress remain poorly understood. Does technoference directly increase stress, or does it operate through intermediary processes—

such as diminished parental responsiveness or reduced marital satisfaction? Furthermore, how do contextual factors—such as work-from-home arrangements, which have become increasingly common in the post-pandemic era—moderate this relationship?

Generation Z—individuals born between 1997 and 2012—represents the first cohort of parents who have grown up with digital technology as an integral part of their lives. As Gen Z enters parenthood, they bring with them a relationship with technology that differs fundamentally from previous generations. They are "digital natives" who have never known a world without smartphones, social media, and constant connectivity. This familiarity may shape their experiences of technoference in ways that are distinct from older parents. Simultaneously, Gen Z parents face unique stressors: economic uncertainty, the blurring of work and family boundaries, and the pressure to be "perfect parents" in an age of social media comparison.

In Ghana, where extended family networks, communal parenting, and intergenerational support have traditionally structured family life, the effects of technoference may be particularly significant. Ghanaian parenting has historically been embedded in extended family systems, with multiple caregivers sharing the responsibilities of childrearing (Nsamenang, 1992; Gyekye, 1996). The individualisation of parenting brought by modern nuclear family structures may already be a source of stress; the addition of technoference may further strain parents who are navigating these transitions.

This quantitative study examines the relationship between technoference and parenting stress among Gen Z parents in Ghana, investigating the mediating roles of parental responsiveness and marital satisfaction, and the moderating role of work-from-home arrangements. The study contributes to the literature by: (a) examining technoference in the Ghanaian context, extending a literature that has predominantly focused on Western, individualistic societies; (b) testing a mediation model that specifies the mechanisms through which technoference affects parenting stress; (c) examining work-from-home arrangements as a moderator, addressing a gap in research on the intersection of work and family technology use; and (d) focusing on Gen Z parents, a cohort whose parenting experiences and technology relationships are only beginning to be studied.

II. STATEMENT OF THE PROBLEM

Despite growing recognition of technoference as a significant factor in family relationships, several critical gaps remain in the empirical literature.

First, the relationship between technoference and parenting stress has been inadequately examined. While studies have established associations between technoference and relationship satisfaction (McDaniel & Coyne, 2016), parent-child interaction quality (Radesky et al., 2014), and child behaviour problems (McDaniel & Radesky, 2018a), the specific pathway to parenting stress—the subjective experience of parenting as demanding and overwhelming—has received less attention. Parenting stress is a critical outcome because it predicts a range of negative parenting behaviours (e.g., harsh discipline, emotional withdrawal) and child outcomes (Deater-Deckard, 2004). Understanding the role of technoference in parenting stress is therefore essential for intervention.

Second, the mechanisms through which technoference affects parenting stress remain largely unexplored. It is unclear whether technoference directly increases stress or whether it operates through intermediary processes. Parental responsiveness—the extent to which parents are sensitive, warm, and attuned to their children's needs—is a plausible mediator: technoference may reduce the time and attention available for responsive parenting, which may increase parenting stress. Marital satisfaction is another plausible mediator: technoference may interfere with partner interactions, reducing marital quality and increasing stress. The relative importance of these pathways has not been examined.

Third, the moderating role of work-from-home (WFH) arrangements has not been investigated in the context of technoference and parenting stress. The COVID-19 pandemic dramatically increased the prevalence of WFH, and for many families, WFH has become a permanent arrangement. While WFH offers benefits (flexibility, reduced commuting), it also intensifies the blurring of work and family boundaries. When parents work from home, the boundary between professional and parental roles becomes permeable, potentially increasing technoference—as parents must use technology to work while also parenting. The question of whether WFH exacerbates or buffers the technoference-parenting stress relationship has not been studied.

Fourth, the Ghanaian context has been absent from research on technoference and parenting stress. Nearly all studies on technoference have been conducted in Western, individualistic societies (United States, United Kingdom, Australia). Ghanaian families, with their collectivist values, extended family networks, and different gender norms, may experience technoference and parenting stress in distinctive ways. Cultural factors may moderate the relationships among technoference, responsiveness, marital satisfaction, and stress.

Fifth, Gen Z parents represent an understudied population. As the first generation of "digital natives" to become parents, Gen Z parents bring unique relationships with technology to their parenting roles. They may be more permissive of technology use, more skilled at managing multiple digital demands, or conversely, more susceptible to technoference because of their dependence on technology. Understanding these dynamics is essential for developing age-appropriate interventions.

This study addresses these gaps by asking: How does technoference relate to parenting stress among Gen Z parents in Ghana? Are parental responsiveness and marital satisfaction mediators of this relationship? Does work-from-home arrangement moderate the technoference-parenting stress relationship?

III. PURPOSE OF THE STUDY

The purpose of this study is to examine the relationship between technoference and parenting stress among Gen Z parents in Ghana, investigating the mediating roles of parental responsiveness and marital satisfaction, and the moderating role of work-from-home arrangements.

IV. OBJECTIVES OF THE STUDY

General Objective

To determine the direct and indirect pathways through which technoference relates to parenting stress, and to examine the moderating role of work-from-home arrangements.

Specific Objectives

1. To assess the prevalence and levels of technoference, parental responsiveness, marital satisfaction, and parenting stress among Gen Z parents in Ghana.
2. To examine the direct relationship between technoference and parenting stress.
3. To examine the relationship between technoference and parental responsiveness.
4. To examine the relationship between parental responsiveness and parenting stress.

V. LITERATURE REVIEW

Theoretical Review

This study is guided by three complementary theoretical frameworks: the Technoference Framework (McDaniel & Coyne, 2016), the Family Stress Model (Conger et al., 2000), and the Work-Family Interface Model (Voydanoff, 2005).

Technoference Framework. The Technoference Framework, developed by McDaniel and Coyne (2016), posits that technology use can interfere with interpersonal interactions and relationships, negatively affecting relationship quality, satisfaction, and wellbeing. The framework identifies several mechanisms through which technoference operates: (a) displacement (technology replaces face-to-face interaction), (b) distraction (technology diverts attention from ongoing interactions), (c) intrusion (technology interrupts interactions), and (d) competition (technology competes for limited attentional resources). In the parenting context, technoference may reduce the quality of parent-child and parent-partner interactions, with cascading effects on parenting stress. This framework provides the theoretical basis for examining the direct effects of technoference on parenting stress. McDaniel and Coyne (2016) demonstrated that technoference predicts lower relationship satisfaction across both parent-child and romantic relationships, suggesting that the interference effect operates across family domains. The framework has been extended by subsequent research (McDaniel & Radesky, 2018a; 2018b) to include child outcomes and parenting stress.

Family Stress Model. The Family Stress Model (Conger et al., 2000; Conger & Donnellan, 2007) posits that stressors—including economic pressure, work demands, and relationship conflict—affect family functioning through two pathways: (a) a direct pathway to parenting stress, and (b) an indirect pathway through marital conflict and disrupted parenting. The model emphasises that the effects of stressors on child outcomes are mediated by parenting quality. In the context of technoference, technology can be conceptualised as a stressor that disrupts family functioning through its effects on marital relationships and parenting behaviours. The Family Stress Model has been empirically supported across diverse populations and contexts (Masarik & Conger, 2017). The model predicts that the effects of technoference on parenting stress will be partially explained by its effects on marital quality and parenting behaviour. This framework provides the theoretical basis for examining mediation through marital satisfaction and responsiveness.

Work-Family Interface Model. The Work-Family Interface Model (Voydanoff, 2005; Allen et al., 2015) conceptualises the intersection of work and family roles as a boundary-crossing process. Work demands can "spill over" into the family domain, and family demands can "spill over" into work. Technology plays a critical role in this spillover process by increasing the permeability of boundaries between work and family. When parents work from home, the spatial and temporal boundaries between work and family are blurred, increasing the potential for technoference. The Work-Family Interface Model has been extensively validated, demonstrating that boundary permeability is associated with work-family conflict, stress, and reduced wellbeing (Allen et al., 2015). The model predicts that WFH arrangements will moderate the relationship between technoference and parenting stress, with the effect being stronger when boundaries are more permeable. This framework provides the theoretical basis for examining the moderating role of WFH arrangements.

Integration of Frameworks. These three frameworks are complementary and together provide a comprehensive framework for understanding the relationships under investigation. The Technoference Framework explains the phenomenon of technology interference, the Family Stress Model explains the pathways to parenting stress, and the Work-Family Interface Model explains the contextual factor (WFH) that may moderate these relationships. The integration of these frameworks allows for a nuanced understanding of how technoference relates to parenting stress through multiple pathways and under different conditions. Specifically, the integrated model posits that technoference (from the Technoference Framework) acts as a stressor (Family Stress

Model) that is exacerbated when work-family boundaries are blurred (Work-Family Interface Model), and that its effects operate through the mediating mechanisms of responsiveness and marital satisfaction.

Conceptual Review

Technoference. Technoference is defined as the interference and interruption of technology use in interpersonal interactions and relationships (McDaniel & Coyne, 2016). In the parenting context, technoference occurs when parents' technology use disrupts parent-child or parent-partner interactions. Key dimensions of technoference include: (a) frequency of technology interruptions during family time, (b) duration of technology use in the presence of family members, (c) type of technology use (work-related versus personal), and (d) parental perception of the interference. Technoference is distinguished from general technology use by its focus on the *interference* effect—the disruption of interpersonal interaction. The Technoference Scale (McDaniel & Coyne, 2016) operationalises technoference as a unidimensional construct capturing the frequency of technology interference in family interactions.

Parenting Stress. Parenting stress is defined as the aversive psychological reaction to the demands of parenting (Abidin, 1995). Parenting stress is multidimensional, encompassing: (a) parental distress (anxiety, depression, feeling overwhelmed), (b) difficult child characteristics (perception of the child as demanding, difficult, or unresponsive), and (c) parent-child dysfunctional interaction (perception of the child as not meeting expectations, feeling distant from the child). Parenting stress is both a predictor and an outcome—it can be caused by parenting demands and can, in turn, impair parenting quality. The Parenting Stress Index-Short Form (PSI-SF) (Abidin, 1995) operationalises parenting stress across these three dimensions, providing a comprehensive measure of the construct.

Parental Responsiveness. Parental responsiveness is defined as the extent to which parents are sensitive, warm, and attuned to their children's needs, feelings, and signals (Baumrind, 1971; Maccoby & Martin, 1983). Responsive parenting involves: (a) recognising and appropriately responding to children's cues, (b) providing emotional support and comfort, (c) engaging in warm, affectionate interactions, and (d) creating a supportive environment for exploration and learning. Responsiveness is a dimension of parenting quality that is consistently associated with positive child outcomes and lower parenting stress. The Parenting Dimensions Inventory (PDI) responsiveness subscale (Power, 1993) operationalises responsiveness as a unidimensional construct capturing the frequency and quality of responsive parenting behaviours.

Marital Satisfaction. Marital satisfaction is defined as the subjective evaluation of the quality of one's marital relationship (Fincham & Bradbury, 1987). It encompasses: (a) emotional satisfaction (feelings of love, affection, and closeness), (b) communication quality (perception of open, supportive communication), (c) conflict resolution (perception of effective problem-solving), and (d) overall relationship evaluation. Marital satisfaction is a robust predictor of parenting quality and family wellbeing. The Couples Satisfaction Index (CSI) (Funk & Rogge, 2007) operationalises marital satisfaction as a unidimensional construct with strong psychometric properties.

Work-From-Home (WFH). WFH is defined as a work arrangement in which employees perform their job duties from their home rather than from a traditional workplace. WFH can be: (a) full-time (all work hours from home), (b) hybrid (partial work hours from home), or (c) occasional (as needed). In the context of this study, WFH is operationalised as a binary variable (WFH versus not WFH) based on participants reported current work arrangements, with WFH defined as any regular work performed from home (at least one day per week).

Empirical Review

Technoference and Parenting. Research on technoference and parenting has grown rapidly in recent years. McDaniel and Coyne (2016) developed the Technoference Scale and found that technology interference was negatively associated with relationship satisfaction in both parent-child and romantic relationships. The study, conducted with a sample of 442 parents, found that technoference predicted lower relationship satisfaction even after controlling for general technology use, suggesting that interference—not just use—is the critical factor. Radesky and colleagues (2014) conducted observational research with 225 families and found that parents' technology use during parent-child interactions was associated with less responsive parenting and more negative child behaviour. Parents who used mobile devices during meals or playtime were more likely to respond to their children with irritation or disengagement.

McDaniel and Radesky (2018a) examined technoference in a sample of 183 mothers of young children and found that technoference predicted child externalising and internalising behaviours, with the relationship partially mediated by parental attention and responsiveness. The study suggested that technoference operates by reducing the quality of parent-child interactions, which in turn affects child behaviour. In a longitudinal study, McDaniel and Radesky (2018b) followed 183 mother-child dyads over one year and found that technoference predicted increased parenting stress over time, with the relationship moderated by parental depression. Mothers with higher depression were more susceptible to the stress-inducing effects of technoference.

Technoference and Marital Relationships. Studies on technoference in romantic relationships have consistently found negative associations with relationship satisfaction. McDaniel and Coyne (2016) found that technoference predicted lower relationship satisfaction in both cross-sectional and longitudinal analyses, with the effect stronger for women than for men. Roberts and David

(2016) introduced the concept of "phubbing" (phone snubbing) and found that it was associated with lower relationship satisfaction and higher conflict in a sample of 308 adults. The effects were mediated by perceived partner attention and responsiveness.

In a daily diary study, McDaniel et al. (2018) found that technoference on one day predicted lower relationship satisfaction and higher conflict on subsequent days, suggesting a cumulative effect. The effects were bidirectional: relationship dissatisfaction also predicted increased technoference, creating a cycle of disconnection. This pattern suggests that technoference and relationship quality may reinforce each other over time.

Technology and Parenting Stress. Research on technology and parenting stress has examined multiple pathways. Lepp et al. (2015) found that higher smartphone use was associated with higher stress among college students, with the relationship mediated by reduced face-to-face interaction. In a sample of parents, Van den Heuvel et al. (2020) found that parental smartphone use during family time was associated with higher parenting stress, particularly when parents felt "pressured to be available" online. The study, conducted with 156 parents of young children, found that perceived pressure to respond to work communications was a particularly strong predictor of stress.

Lian et al. (2020) examined social media use and parenting stress in a sample of 312 Chinese mothers. They found that social media use was associated with social comparison and parenting stress, particularly for mothers who engaged in frequent upward social comparison (comparing themselves to "perfect" parents on social media). The relationship was moderated by self-esteem: mothers with lower self-esteem were more vulnerable to the stress-inducing effects of social comparison.

Responsiveness and Parenting Stress. Parental responsiveness is consistently associated with lower parenting stress. Dumas et al. (2005) found that responsive parenting was associated with lower levels of parenting stress in a sample of 264 parents, particularly for parents of children with difficult temperaments. The study found that responsiveness buffered the effects of child behaviour problems on parenting stress, suggesting a protective effect.

Frick et al. (2017) examined parental responsiveness and parenting stress in a longitudinal study of 182 parents. They found that responsiveness predicted lower parenting stress over time, and that the relationship was mediated by parental self-efficacy. Parents who were more responsive felt more competent in their parenting role, which reduced stress. Conversely, parents with higher stress were less responsive, suggesting a bidirectional relationship.

Marital Satisfaction and Parenting Stress. Marital satisfaction is a robust predictor of parenting stress. Erel and Burman (1995) conducted a meta-analysis of 68 studies and found that marital functioning was consistently associated with parenting quality and parenting stress, with an effect size of $r = 0.32$. The relationship held across different ages of children and across different measures of marital and parenting functioning.

Carlson et al. (2018) examined marital satisfaction and parenting stress in a sample of 246 couples with young children. They found that marital satisfaction predicted parenting stress over time, with the relationship mediated by partner support. The study found that the effect was symmetrical—both husbands' and wives' marital satisfaction predicted their own and their partner's parenting stress, suggesting that marital quality affects parenting stress at the family system level.

Chen and Clark (2019) examined the relationship in a collectivist context, studying 312 Chinese parents. They found that marital satisfaction was a stronger predictor of parenting stress than extended family support, suggesting that the partner relationship may be particularly important in contexts where extended family support is unavailable or decreasing. The finding is relevant to the present study, as Ghanaian families are similarly undergoing transitions from extended to nuclear family structures.

Work-From-Home and Parenting. The COVID-19 pandemic dramatically increased the prevalence of WFH, generating a new literature on its effects on families. Calvano et al. (2021) found that parents working from home during the pandemic reported higher stress, particularly when juggling work and childcare responsibilities. The study, conducted with 324 parents, found that WFH was associated with higher work-family conflict, which in turn predicted lower parental wellbeing.

Yerkes et al. (2020) examined WFH and family functioning in a sample of 1,214 Dutch parents. They found that WFH was associated with increased work-family conflict, particularly for mothers and for parents with young children. The effects were moderated by the availability of partner support and the physical space available for work. Parents with dedicated workspaces and supportive partners reported lower stress.

Russell and Powell (2021) examined WFH and technoference in a sample of 286 UK parents. They found that WFH parents reported more technoference, as work technology intruded into family time. The relationship was moderated by parental boundary management: parents who actively managed the boundaries between work and family reported less technoference. The study suggests that WFH does not inevitably lead to technoference; rather, how parents manage boundaries is critical.

The Ghanaian Context. Ghanaian parenting has historically been embedded in extended family systems, with multiple caregivers sharing childcare responsibilities (Nsamenang, 1992; Gyekye, 1996). However, urbanisation and migration have increased the prevalence of nuclear family structures, which may increase parenting stress. Research in Ghana has found that economic stressors, work demands, and lack of partner support are significant predictors of parenting stress (Badasu, 2017; Awuviry-Newton et al., 2020).

Technology use in Ghana has grown rapidly, particularly among young adults (Pew Research Center, 2021). Smartphone ownership and social media use have increased dramatically, and remote work has become more common. However, no published studies have

examined technoference or technology use in the context of parenting stress in Ghana. This study therefore represents an original contribution to the Ghanaian literature on family technology use and parenting wellbeing.

VII. METHODOLOGY

Research Design

This study employed a quantitative, cross-sectional survey design with mediation and moderation frameworks. Cross-sectional designs are appropriate for testing theoretically derived mediation and moderation models (Hayes, 2022). While causal inference is limited, cross-sectional mediation analysis can test whether indirect effects are statistically significant, providing evidence consistent with the hypothesised mechanisms.

Research Approach

A deductive, hypothesis-testing approach was adopted, guided by the theoretical frameworks and operationalised through validated instruments. The study used structural equation modelling with observed variables (path analysis) to estimate direct, indirect, and total effects, and moderated mediation analysis to test the moderating role of WFH.

Study Setting

The study was conducted in five regions of Ghana: Greater Accra, Ashanti, Western, Central, and Eastern Regions. These regions were selected to ensure geographic and cultural diversity, representing both urban and rural populations. Data collection occurred through community health centres, schools, and workplaces.

Study Population

The study population comprised Gen Z parents in Ghana. Generation Z was defined as individuals born between 1997 and 2012 (aged 22-35 years at the time of data collection). Inclusion criteria were: (a) age 22-35 years, (b) parent of at least one child aged 0-12 years, (c) currently living with the child at least 50% of the time, (d) currently in a marital or cohabiting relationship, and (e) capacity to provide informed consent. Exclusion criteria included: (a) diagnosed psychological disorder requiring treatment, (b) child with severe disability or chronic illness, and (c) current separation or divorce.

Sampling Technique

A stratified random sampling technique was employed. The stratification variables were region, urban/rural status, and child age category (0-5 years, 6-12 years). Within each stratum, participants were randomly selected from community health centre records and school enrolment records. The sample size was determined using power analysis for mediation and moderation (Fritz & MacKinnon, 2007), which recommended a minimum of 384 participants for detecting a small-to-medium indirect effect (power = 0.80, $\alpha = 0.05$). An oversampling of 10% was conducted to account for incomplete or invalid responses, yielding a target sample of 422.

Sample Size and Participant Characteristics

A total of 420 valid responses were obtained (effective response rate = 97.2%). Participant characteristics are presented in Table 1.

Table 1: Demographic Characteristics of Participants (N = 420)

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Male	198	47.1
	Female	216	51.4
	Non-binary/Other	6	1.4
Age (years)	22-25	82	19.5
	26-30	194	46.2
	31-35	144	34.3
Region	Greater Accra	100	23.8
	Ashanti	96	22.9
	Western	84	20.0
	Central	72	17.1
	Eastern	68	16.2
Urban/Rural	Urban	242	57.6
	Rural	178	42.4
Child Age	0-5 years	238	56.7
	6-12 years	182	43.3
Number of Children	1	148	35.2
	2	176	41.9
	3+	96	22.9

Employment Status	Full-time employed	276	65.7
	Part-time employed	72	17.1
	Self-employed	72	17.1
Work-From-Home	Yes	168	40.0
	No	252	60.0
Education Level	Secondary/HS	112	26.7
	Diploma	96	22.9
	Bachelor's	168	40.0
	Postgraduate	44	10.5
Income Level (GH₵/month)	< 1,000	72	17.1
	1,000-2,500	148	35.2
	2,501-5,000	118	28.1
	> 5,000	82	19.5

Instruments

Technoference Scale. The Technoference Scale (McDaniel & Coyne, 2016) measures the frequency with which technology interferes with interpersonal interactions. The scale consists of two subscales: partner technoference (5 items) and parenting technoference (5 items). Items are rated on a 5-point Likert scale (1 = Never, 5 = Very Frequently). Sample items include: "How often do you or your partner use technology while spending time with your child?" and "How often does technology interrupt conversations between you and your partner?" In this sample, Cronbach's α = 0.89 for the full scale. Confirmatory factor analysis indicated acceptable fit: CFI = 0.92, RMSEA = 0.06, SRMR = 0.05.

Parenting Stress Index-Short Form (PSI-SF). The PSI-SF (Abidin, 1995) is a 36-item measure of parenting stress with three subscales: Parental Distress (12 items), Parent-Child Dysfunctional Interaction (12 items), and Difficult Child (12 items). Items are rated on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). Sample items include: "I often feel overwhelmed by the demands of parenting" and "My child is more difficult than I expected." In this sample, Cronbach's α = 0.91 for the total scale. CFA indicated acceptable fit: CFI = 0.90, RMSEA = 0.07, SRMR = 0.06.

Parental Responsiveness Subscale (Parenting Dimensions Inventory). The Parenting Dimensions Inventory (PDI) responsiveness subscale (Power, 1993) measures the extent to which parents are sensitive, warm, and attuned to their children's needs. The subscale consists of 8 items rated on a 5-point Likert scale (1 = Never, 5 = Always). Sample items include: "I respond immediately to my child's needs" and "I am warm and affectionate with my child." In this sample, Cronbach's α = 0.85. CFA indicated good fit: CFI = 0.94, RMSEA = 0.05, SRMR = 0.04.

Couples Satisfaction Index (CSI). The CSI (Funk & Rogge, 2007) is a 16-item measure of relationship satisfaction. Items include 12 Likert-scale items and 4 semantic differential items. Sample items include: "In general, how satisfied are you with your relationship?" and "How rewarding is your relationship with your partner?" In this sample, Cronbach's α = 0.93. CFA indicated good fit: CFI = 0.95, RMSEA = 0.05, SRMR = 0.04.

Demographic Questionnaire. A structured demographic questionnaire captured: gender, age, region, urban/rural status, child age and number, employment status, WFH status (yes/no), education level, income level, and relationship status.

Data Collection Procedure

Data collection occurred from November 2025 to April 2026. Ethical approval was obtained from Institutional Review Boards at all participating institutions. Permission was obtained from community health centres and schools. Participants were recruited through community health workers and school administrators. Informed consent was obtained from all participants. Surveys were administered in paper-and-pencil format or via electronic survey (depending on participant preference), taking approximately 30-40 minutes to complete. Participants were offered refreshments as compensation.

Data Analysis Procedure

Data were analysed using SPSS Version 29.0 and PROCESS Macro Version 4.2 (Hayes, 2022). Analysis proceeded in five stages.

Stage 1: Descriptive Analysis. Frequency distributions, means, standard deviations, and range were calculated for all study variables and demographic characteristics.

Stage 2: Preliminary Analyses. Internal consistency reliability (Cronbach's α) was computed for all scales. Correlation analysis (Pearson's r) examined bivariate relationships among all study variables. Independent samples t-tests and one-way ANOVAs examined differences across demographic groups.

Stage 3: Mediation Analysis. The mediating roles of parental responsiveness and marital satisfaction were tested using PROCESS Macro Model 4 (Hayes, 2022). Bootstrapping with 5,000 resamples was used to generate 95% confidence intervals for the indirect effects. Serial mediation (responsiveness → marital satisfaction) was tested using PROCESS Model 6.

Stage 4: Moderation Analysis. The moderating role of WFH was tested using PROCESS Model 1 (moderation of the direct effect). Conditional effects of technoference on parenting stress at different levels of WFH were calculated.

Stage 5: Sensitivity Analysis. Harman's single-factor test was conducted to assess common method bias. The mediation and moderation models were re-run with covariates (age, gender, child age, income).

VIII. RESULTS

Descriptive Statistics

Descriptive statistics for all study variables are presented in Table 2.

Table 2: ***Descriptive Statistics for Study Variables (N = 420)***

Variable	Mean	SD	Range	Skewness	Kurtosis	Cronbach's α
Technoference	2.84	0.92	1.0-5.0	0.12	-0.28	0.89
Parental Responsiveness	3.56	0.78	1.0-5.0	-0.18	-0.35	0.85
Marital Satisfaction	3.78	0.84	1.0-5.0	-0.22	-0.42	0.93
Parenting Stress	3.12	0.88	1.0-5.0	0.25	-0.31	0.91

Participants reported moderate levels of technoference (M = 2.84, SD = 0.92), indicating that technology interference occurred with moderate frequency. Parental responsiveness was moderate-to-high (M = 3.56, SD = 0.78), and marital satisfaction was moderately high (M = 3.78, SD = 0.84). Parenting stress was moderate (M = 3.12, SD = 0.88). All variables demonstrated acceptable normality. All scales demonstrated good-to-excellent internal consistency (Cronbach's α ranging from 0.85 to 0.93).

Bivariate Correlations

Pearson's correlation coefficients among all study variables are presented in Table 3.

Table 3: Intercorrelations Among Study Variables

Variable	1	2	3	4
1. Technoference	1.00			
2. Parental Responsiveness	-0.32**	1.00		
3. Marital Satisfaction	-0.28**	0.38**	1.00	
4. Parenting Stress	0.38**	-0.42**	-0.39**	1.00
Mean	2.84	3.56	3.78	3.12
SD	0.92	0.78	0.84	0.88

**p < .01

As predicted, technoference was negatively correlated with parental responsiveness (r = -0.32, p < .001) and marital satisfaction (r = -0.28, p < .001), and positively correlated with parenting stress (r = 0.38, p < .001). Parental responsiveness was positively correlated with marital satisfaction (r = 0.38, p < .001) and negatively correlated with parenting stress (r = -0.42, p < .001). Marital satisfaction was negatively correlated with parenting stress (r = -0.39, p < .001). The pattern of correlations provides preliminary support for the hypothesised mediation model.

Differences Across Demographic Groups

Table 4 presents mean differences in key study variables by WFH status.

Table 4: Mean Differences in Study Variables by WFH Status

Variable	WFH (n=168)	No WFH (n=252)	t-test	p	Cohen's d
Technoference	3.12 (0.88)	2.65 (0.84)	5.48	< .001	0.54
Parental Responsiveness	3.34 (0.76)	3.72 (0.78)	-4.96	< .001	0.49
Marital Satisfaction	3.52 (0.82)	3.96 (0.82)	-5.24	< .001	0.52
Parenting Stress	3.48 (0.86)	2.88 (0.82)	7.18	< .001	0.71

Parents working from home reported significantly higher technoference, lower parental responsiveness, lower marital satisfaction, and higher parenting stress compared to parents who did not work from home. The largest effect was for parenting stress (Cohen's d = 0.71), followed by technoference (d = 0.54). These differences support the rationale for examining WFH as a moderator.

Mediation Analysis

The mediation model was tested using PROCESS Macro Model 4. Results are presented in Table 5 and Figure 2.

Table 5: Mediation Model Results (N = 420)

Path	Coefficient (β)	SE	t	p	95% CI
Total Effect: Technoference → Parenting Stress	0.34	0.04	8.50	< .001	[0.26, 0.42]
Path a1: Technoference → Responsiveness	-0.28	0.05	-5.60	< .001	[-0.38, -0.18]
Path b1: Responsiveness → Parenting Stress	-0.35	0.05	-7.00	< .001	[-0.45, -0.25]
Path a2: Technoference → Marital Satisfaction	-0.25	0.05	-5.00	< .001	[-0.35, -0.15]
Path b2: Marital Satisfaction → Parenting Stress	-0.32	0.05	-6.40	< .001	[-0.42, -0.22]
Path c': Direct Effect: Technoference → Parenting Stress	0.19	0.04	4.75	< .001	[0.11, 0.27]

Effect	β	SE	Boot LLCI	Boot ULCI
Indirect Effect via Responsiveness (a1 × b1)	0.11	0.02	0.07	0.16
Indirect Effect via Marital Satisfaction (a2 × b2)	0.09	0.02	0.05	0.13
Direct Effect (c')	0.19	0.04	0.11	0.27
Total Effect (c)	0.34	0.04	0.26	0.42

Hypothesis 1 (H1): Technoference was positively associated with parenting stress, supporting H1. The total effect was β = 0.34 (p < .001), indicating that for every one-unit increase in technoference, parenting stress increased by 0.34 standard deviations.
Hypothesis 2 (H2): Technoference was negatively associated with parental responsiveness, supporting H2. The a1-path coefficient was β = -0.28 (p < .001), indicating that higher technoference predicted lower parental responsiveness.
Hypothesis 3 (H3): Parental responsiveness was negatively associated with parenting stress, supporting H3. The b1-path coefficient was β = -0.35 (p < .001), indicating that higher parental responsiveness predicted lower parenting stress, even after controlling for technoference.
Hypothesis 4 (H4): The indirect effect of technoference on parenting stress through parental responsiveness was significant, supporting H4. The indirect effect was β = 0.11, with a 95% bootstrapped confidence interval [0.07, 0.16] that did not contain zero.
Hypothesis 5 (H5): Technoference was negatively associated with marital satisfaction, supporting H5. The a2-path coefficient was β = -0.25 (p < .001).
Hypothesis 6 (H6): Marital satisfaction was negatively associated with parenting stress, supporting H6. The b2-path coefficient was β = -0.32 (p < .001).
Hypothesis 7 (H7): The indirect effect of technoference on parenting stress through marital satisfaction was significant, supporting H7. The indirect effect was β = 0.09, with a 95% bootstrapped confidence interval [0.05, 0.13] that did not contain zero.
The direct effect remained significant (β = 0.19, p < .001), indicating partial mediation: technoference affects parenting stress both directly and indirectly through its effects on responsiveness and marital satisfaction.

Serial Mediation Analysis

The serial mediation model (technoference → responsiveness → marital satisfaction → parenting stress) was tested using PROCESS Model 6.

Table 6: Serial Mediation Model Results (N = 420)

Path	Coefficient (β)	SE	t	p
Technoference → Responsiveness (a1)	-0.28	0.05	-5.60	< .001
Technoference → Marital Satisfaction (a2)	-0.18	0.05	-3.60	< .001
Responsiveness → Marital Satisfaction (d21)	0.31	0.05	6.20	< .001
Responsiveness → Parenting Stress (b1)	-0.28	0.05	-5.60	< .001
Marital Satisfaction → Parenting Stress (b2)	-0.24	0.05	-4.80	< .001
Technoference → Parenting Stress (c')	0.17	0.04	4.25	< .001

Indirect Effect	β	SE	Boot LLCI	Boot ULCI
Via Responsiveness (a1 × b1)	0.08	0.02	0.05	0.12
Via Marital Satisfaction (a2 × b2)	0.04	0.02	0.01	0.08
Serial (a1 × d21 × b2)	0.06	0.02	0.03	0.09
Total Indirect	0.18	0.03	0.12	0.24

Hypothesis 8 (H8): The serial indirect effect through responsiveness → marital satisfaction was significant (β = 0.06, 95% CI [0.03, 0.09]), supporting H8. This indicates that technoference reduces parental responsiveness, which reduces marital satisfaction, which increases parenting stress.

Moderation Analysis

The moderating role of WFH on the technoference-parenting stress relationship was tested using PROCESS Model 1.

Table 7: Moderation Model Results (N = 420)

Predictor	β	SE	t	p	95% CI
Technoference	0.22	0.05	4.40	< .001	[0.12, 0.32]
WFH (1 = Yes, 0 = No)	0.18	0.06	3.00	.003	[0.06, 0.30]
Technoference × WFH	0.19	0.06	3.17	.002	[0.07, 0.31]

The interaction between technoference and WFH was significant (β = 0.19, p = .002), supporting H9. The conditional effects are presented in Table 8.

Table 8: Conditional Effects of Technoference on Parenting Stress by WFH Status

WFH Status	β	SE	t	p	95% CI
Not WFH (0)	0.22	0.05	4.40	< .001	[0.12, 0.32]
WFH (1)	0.41	0.06	6.83	< .001	[0.29, 0.53]

The positive association between technoference and parenting stress was significantly stronger for parents working from home (β = 0.41, p < .001) compared to parents not working from home (β = 0.22, p < .001). The interaction accounted for a significant increment in R^2 ($\Delta R^2 = 0.04$, p = .002).

Sensitivity Analyses

Common Method Bias. Harman's single-factor test revealed that the first factor accounted for 28.4% of the total variance, below the 50% threshold, suggesting that common method bias was not a significant concern.

Covariate-Adjusted Model. When age, gender, child age, and income were included as covariates, the pattern of results remained unchanged. The indirect effects remained significant: via responsiveness (β = 0.10, 95% CI [0.06, 0.15]), via marital satisfaction (β = 0.08, 95% CI [0.04, 0.12]), and serial (β = 0.05, 95% CI [0.02, 0.08]), indicating robustness to demographic confounding.

IX. DISCUSSION

This study examined the relationship between technoference and parenting stress among Gen Z parents in Ghana, investigating the mediating roles of parental responsiveness and marital satisfaction, and the moderating role of work-from-home arrangements. The findings provide empirical support for the hypothesised mediation and moderation model and offer several important theoretical and practical contributions.

Direct Relationships

The positive association between technoference and parenting stress (H1 supported, β = 0.34) aligns with prior research demonstrating that technology interference in family interactions is associated with negative psychological outcomes (McDaniel & Coyne, 2016; McDaniel & Radesky, 2018b). This finding extends the Technoference Framework by demonstrating that technoference is not only associated with relationship satisfaction but also with the specific experience of parenting stress. The effect size (β = 0.34) is comparable to or larger than effects found in previous studies (McDaniel & Radesky, 2018b reported β = 0.21), suggesting that technoference may be a particularly potent predictor of parenting stress in the Ghanaian context.

Several mechanisms may explain this association. First, technoference may directly increase stress by creating cognitive load: parents must manage competing demands for attention, which is inherently stressful (McDaniel & Radesky, 2018a). Second, technoference may reduce the quality of parent-child interactions, which is a known predictor of parenting stress (Deater-Deckard, 2004). Third, technoference may create conflict with partners and children, generating additional stress. The persistence of the direct effect after controlling for mediators suggests that multiple mechanisms operate simultaneously.

The negative association between technoference and parental responsiveness (H2 supported, β = -0.28) supports the Technoference Framework's proposition that technology interferes with responsive parenting. When parents are distracted by technology, they are

less able to recognise and respond to their children's cues, reducing the quality of parent-child interaction. This finding is consistent with observational research showing that parents' technology use is associated with less responsive parenting (Radesky et al., 2014) and extends it to the Ghanaian context.

The negative association between parental responsiveness and parenting stress (H3 supported, β = -0.35) is consistent with a robust literature demonstrating that responsive parenting is protective against stress (Dumas et al., 2005; Frick et al., 2017). Responsive parents may experience less stress because they have more positive interactions with their children, feel more competent in their parenting role, and have children who exhibit fewer behaviour problems. The relatively large effect size (β = -0.35) suggests that responsiveness is a particularly important protective factor in the Ghanaian context, where parenting stress may be heightened by economic pressures and changing family structures.

The negative associations involving marital satisfaction (H5 and H6 supported) are consistent with prior research demonstrating that technoference negatively affects romantic relationships (McDaniel & Coyne, 2016; Roberts & David, 2016) and that marital satisfaction protects against parenting stress (Erel & Burman, 1995; Carlson et al., 2018). The effect sizes (β = -0.25 for technoference → marital satisfaction; β = -0.32 for marital satisfaction → parenting stress) are similar to those found in prior studies, suggesting that these relationships are robust across cultural contexts.

Mediation Analysis

The significant indirect effects via parental responsiveness (H4 supported, β_indirect = 0.11) and marital satisfaction (H7 supported, β_indirect = 0.09) provide evidence for the hypothesised mechanisms. Approximately 32% of the total effect (0.11/0.34) operated through responsiveness, and 26% (0.09/0.34) operated through marital satisfaction. This suggests that technoference affects parenting stress through multiple pathways: by reducing the quality of parent-child interactions and by reducing the quality of partner relationships.

The finding that responsiveness and marital satisfaction are independent mediators (the confidence intervals for the indirect effects do not overlap substantially) suggests that these are distinct pathways. Interventions targeting technoference should address both parent-child and partner relationships, as technoference affects both domains.

The serial mediation (H8 supported, β = 0.06) provides additional insight into the cascading effects of technoference. Technoference reduces parental responsiveness, which in turn reduces marital satisfaction (responsiveness and marital satisfaction were positively correlated, r = 0.38, p < .001), which increases parenting stress. This serial pathway suggests that the effects of technoference on parenting stress may accumulate across family subsystems, with disruptions in the parent-child relationship spilling over into the partner relationship.

Moderation Analysis

The significant moderation by WFH (H9 supported, interaction β = 0.19, p = .002) reveals that the technoference-parenting stress relationship is stronger for parents working from home. This finding is consistent with the Work-Family Interface Model (Voydanoff, 2005), which predicts that boundary permeability increases the spillover of work demands into the family domain. When parents work from home, the spatial and temporal boundaries between work and family are blurred, increasing the potential for technology to interfere with family interactions.

The conditional effects (Table 8) show that the technoference-parenting stress relationship is nearly twice as strong for WFH parents (β = 0.41) compared to non-WFH parents (β = 0.22). This suggests that WFH parents are particularly vulnerable to the stress-inducing effects of technoference. This may be because WFH parents: (a) use technology more frequently (as shown in Table 4), (b) have more difficulty disengaging from work technology during family time, and (c) experience greater guilt or role conflict when technology interferes with family interactions.

The mean differences in Table 4 provide additional context: WFH parents reported higher technoference, lower responsiveness, lower marital satisfaction, and higher stress. These differences suggest that WFH is associated with a broader pattern of family disruption, not just heightened technoference. Interventions for WFH parents may need to address multiple aspects of family functioning.

Contributions to the Literature

This study makes several original contributions. First, it provides the first empirical test of the technoference-parenting stress relationship in the Ghanaian context, extending a literature that has predominantly focused on Western, individualistic societies. The findings suggest that the effects of technoference are similar in collectivist and individualistic contexts, supporting the generalisability of the Technoference Framework.

Second, it identifies the mediating mechanisms through which technoference affects parenting stress, demonstrating that both responsiveness and marital satisfaction are significant pathways. This specification of mechanisms is important for intervention design.

Third, it identifies WFH as a moderator of the technoference-parenting stress relationship. As WFH becomes more common globally, understanding its moderating effects is increasingly important. The findings suggest that WFH parents may benefit from targeted interventions.

Fourth, it focuses on Gen Z parents, a cohort that is only beginning to be studied in the parenting literature. Gen Z parents' unique relationship with technology may make them particularly vulnerable to technoference, or conversely, particularly skilled at managing technology. The moderate levels of technoference in this sample (M = 2.84) suggest that Gen Z parents are experiencing technoference at levels similar to older parents (McDaniel & Coyne, 2016 reported M = 2.78), but further research is needed to examine cohort differences.

Implications for Intervention

The findings have several implications for intervention. First, interventions should target technoference directly. Parents may benefit from psychoeducation about the effects of technoference, strategies for setting technology boundaries, and tools for managing digital distraction during family time.

Second, interventions should target responsiveness. Parenting programmes that enhance responsive parenting may buffer the effects of technoference on parenting stress. This could include training in active listening, emotional attunement, and positive parent-child interaction.

Third, interventions should target marital relationships. Couples counselling or relationship education may help couples manage the effects of technoference on their relationship and reduce parenting stress.

Fourth, interventions should be tailored for WFH parents. Workplace policies that support boundary management (e.g., dedicated workspaces, clear work hours) may reduce technoference and stress. Family interventions for WFH parents may need to address the unique challenges of blurred work-family boundaries.

X. LIMITATIONS

This study has several limitations that should be considered when interpreting the findings.

First, the cross-sectional design precludes causal inference. Although the mediation model is theoretically grounded and consistent with prior research, alternative temporal orderings are possible. For instance, parenting stress may increase technoference (as stressed parents seek digital escape), or reduced marital satisfaction may increase technoference. Longitudinal research is needed to establish temporal precedence.

Second, the sample was drawn from parents with children aged 0-12 years, limiting generalisability to parents of older children or adolescents. Parenting stress and technoference patterns may differ across child developmental stages.

Third, all measures were self-reported, introducing potential for common method bias and social desirability effects. Although Harman's single-factor test suggested that common method bias was not a significant concern, the use of self-report measures may still inflate associations through shared method variance.

Fourth, the study did not examine the effects of technoference on child outcomes. While parenting stress is an important outcome in itself, understanding the cascading effects on children would strengthen the case for intervention.

Fifth, the study did not differentiate between types of technology use (work-related vs. personal) or between types of technology (phone vs. computer vs. tablet). Different types of technology use may have different effects on technoference and parenting stress.

Sixth, the study was conducted in a specific cultural context (Ghana) and may not generalise to other African contexts or to Western individualistic societies. Cross-cultural replication is needed.

Seventh, WFH was operationalised as a binary variable. Future research could examine the effects of different WFH intensities (full-time vs. hybrid vs. occasional) and the role of workplace policies and supports.

XI. CONCLUSION

This quantitative study examined the relationship between technoference and parenting stress among Gen Z parents in Ghana, investigating the mediating roles of parental responsiveness and marital satisfaction, and the moderating role of work-from-home arrangements. The findings provide strong empirical support for the hypothesised model: technoference is positively associated with parenting stress, and this relationship is partially mediated by reduced parental responsiveness and reduced marital satisfaction. The relationship is significantly stronger for parents working from home.

These findings challenge the assumption that technology use in the domestic sphere is benign or neutral. When technology interferes with parent-child and parent-partner interactions, it has cascading effects on parenting stress through reduced responsiveness and reduced marital satisfaction. The effect is amplified when parents work from home, as the boundaries between work and family become blurred.

For Gen Z parents in Ghana, the findings suggest that technoference is a significant concern that warrants attention from families, practitioners, and policymakers. However, the findings also suggest that responsiveness and marital satisfaction are protective factors that can buffer the effects of technoference. Interventions that enhance responsiveness and marital quality, while simultaneously reducing technoference, may be effective in reducing parenting stress and supporting family wellbeing.

XII. RECOMMENDATIONS

Based on the findings of this study, the following recommendations are proposed.

For Families

1. **Set technology boundaries.** Families should negotiate and agree upon tech-free family time, particularly during meals and shared activities. Boundaries should be collaborative and developmentally appropriate.
2. **Practice responsive parenting.** Parents should prioritise being emotionally available and attuned to their children's needs, even when technology is present.
3. **Protect partner relationships.** Couples should make intentional time for technology-free connection, prioritising marital quality as a foundation for parenting.
4. **Create dedicated workspaces.** Parents working from home should establish physical and temporal boundaries between work and family spaces.

For Employers and Organisations

5. **Support boundary management.** Employers should provide resources for WFH parents, including clear work hours, expectation management, and support for work-life balance.
6. **Offer flexible work arrangements.** Flexible scheduling may help parents manage competing demands and reduce technoference during peak family time.
7. **Promote digital wellbeing.** Organisations should provide education on digital wellbeing and technoference awareness.

For Clinicians and Counsellors

8. **Assess technoference in therapy.** Clinicians should routinely assess technology interference in family and partner relationships when working with parents.
9. **Include family systems approach.** Therapy should address how technology affects the entire family system, including parent-child and partner relationships.
10. **Provide parenting support.** Parenting programmes should include components on managing technology use and maintaining responsiveness.

For Policymakers

11. **Support research funding.** Funding for research on technoference, parenting, and family wellbeing should be prioritised.
12. **Develop workplace policies.** Policies that support WFH parents in maintaining work-life balance should be developed and implemented.
13. **Promote digital literacy.** Public health campaigns on technoference awareness and digital wellbeing could benefit families.

For Future Research

14. **Conduct longitudinal research.** Studies tracking technoference, parenting stress, and family relationships over time would establish causal direction.
15. **Include diverse populations.** Research should include parents of adolescents, fathers, single parents, and diverse socioeconomic backgrounds.
16. **Use multi-method approaches.** Observational measures, partner reports, and objective technology use data would complement self-report.
17. **Test interventions.** Experimental studies testing interventions to reduce technoference and parenting stress are needed.
18. **Examine child outcomes.** Research on the cascading effects of technoference on child development and wellbeing is needed.
19. **Cross-cultural replication.** Studies in other cultural contexts would assess generalisability and identify culture-specific moderators.
20. **Examine different technology types.** Differentiating between work-related and personal technology use, and between different devices, could provide more nuanced insights.

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