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PHUBBED AT HOME: ASSESSING THE EXTENT TO WHICH WORKING-FROM-HOME INTENSIFIES THE PATH FROM TECHNOFERENCE TO PARENTING STRESS

***Prof. Jemima N. A. A. Lomotey, PhD**

Dean, Counselling and Psychology, Rudolph Kwanue University, Monrovia, Liberia.

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***Corresponding Author: Jemima N. A. A. Lomotey**
Dean, Counselling and Psychology, Rudolph Kwanue University, Monrovia, Liberia.

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ABSTRACT

The proliferation of smartphones and digital devices in the domestic sphere has introduced "technoference," the interference of technology in interpersonal interactions, as a significant concern for family wellbeing. Among parents, the experience of being "phubbed" (phone-snubbed) by partners or engaging in technology interference during family time has been associated with increased parenting stress. However, the contextual factors that intensify or buffer this relationship remain poorly understood. This quantitative study examines the extent to which work-from-home (WFH) arrangements intensify the path from technoference to parenting stress among Gen Z parents in Ghana. Using a cross-sectional survey design, data were collected from 420 parents (aged 22-35 years) through stratified random sampling across five regions of Ghana. Validated instruments measured technoference (Technoference Scale), parenting stress (Parenting Stress Index-Short Form), and WFH status. Moderation analysis using PROCESS Macro (Model 1) with 5,000 bootstrap resamples revealed that technoference was positively associated with parenting stress ($\beta = 0.34$, $p < .001$). WFH significantly moderated this relationship (interaction $\beta = 0.19$, $p = .002$), with the association between technoference and parenting stress being significantly stronger for parents working from home ($\beta = 0.41$, $p < .001$) compared to those not working from home ($\beta = 0.22$, $p < .001$). The moderated effect was partially explained by heightened technoference among WFH parents ($M = 3.12$ vs. 2.65, $d = 0.54$) and by the blurring of work-family boundaries. Mediation analysis revealed that perceived boundary blurring partially mediated the moderated effect (index of moderated mediation = 0.08, 95% CI [0.04, 0.13]). The findings extend the Technoference Framework and the Work-Family Interface Model by

demonstrating that WFH intensifies the technoference-parenting stress pathway through increased technology exposure and boundary permeability. Implications for workplace policies, family interventions, and digital wellbeing are discussed.

KEYWORDS: *Phubbing, technoference, parenting stress, work-from-home, boundary blurring, moderation, Gen Z, Ghana*

I. INTRODUCTION

The smartphone has become an indispensable tool for modern parenting. From coordinating school pickups to managing household finances, from accessing parenting resources to staying connected with children's schools, parents rely on digital technology to navigate the demands of family life. Yet this same technology that facilitates parenting also interferes with it. The phenomenon of "phubbing" the act of snubbing a conversation partner by focusing on one's phone (Roberts & David, 2016) has become a pervasive feature of family life. When parents phub their children or partners, they communicate devaluation, disinterest, and prioritisation of the digital world over the present relationship. This technology interference, or "technoference" (McDaniel & Coyne, 2016), has significant consequences for parenting stress.

Parenting stress, the aversive psychological reaction to the demands of parenting (Abidin, 1995) is a critical outcome with cascading effects on parenting quality, child development, and family wellbeing. When technology interferes with parent-child and parent-partner interactions, the demands of parenting may feel more overwhelming, and the resources for coping (supportive relationships, responsive interactions) may be diminished. Understanding the factors that intensify or buffer the technoference-parenting stress relationship is essential for developing effective interventions.

The COVID-19 pandemic dramatically reshaped the landscape of work and family life, with work-from-home (WFH) arrangements becoming a permanent feature for many families. While WFH offers benefits flexibility, reduced commuting, increased time with family it also introduces challenges. When parents work from home, the boundaries between professional and parental roles become blurred. Work technology intrudes into family time, and family demands intrude into work time. This boundary blurring may intensify the effects of technoference on parenting stress. When parents are already navigating the stress of working from home while parenting, the additional burden of technology interference may be particularly costly.

Generation Z individuals, born between 1997 and 2012, represent the first cohort of parents who grew up with smartphones as an integral part of their lives. As Gen Z parents navigate the demands of raising children in a digital age, they face unique challenges. They are "digital natives" who have never known a world without constant connectivity, yet they must simultaneously manage their children's developmental needs and their partners' relational needs. The intersection of WFH, technoference, and parenting stress may be particularly relevant for this cohort.

In Ghana, where extended family networks and communal parenting have traditionally structured family life, the effects of phubbing and technoference may be especially significant. Ghanaian culture emphasises presence, respect, and attentiveness in family interactions (Nsamenang, 1992; Gyekye, 1996). The intrusion of technology into these interactions may violate cultural norms and create unique sources of stress. Yet, no published research has examined the moderating role of WFH in the technoference-parenting stress relationship in the Ghanaian context.

This quantitative study examines the extent to which WFH intensifies the path from technoference to parenting stress among Gen Z parents in Ghana. The study investigates whether WFH moderates the technoference-parenting stress relationship and whether boundary blurring mediates this moderated effect.

II. STATEMENT OF THE PROBLEM

Despite growing recognition of technoference as a significant concern for family wellbeing, and despite increasing prevalence of WFH arrangements, several critical gaps remain in the empirical literature.

First, the moderating role of WFH in the technoference-parenting stress relationship has not been systematically examined. While studies have established associations between technoference and parenting stress (McDaniel & Radesky, 2018b), and separate studies have examined WFH and family stress (Calvano et al., 2021; Yerkes et al., 2020), the intersection how WFH intensifies or buffers the technoference-parenting stress relationship has not been tested. This is a significant gap because WFH has become a permanent feature of the work landscape for many families, and understanding its moderating effects is essential for developing targeted interventions.

Second, the mechanisms through which WFH intensifies the technoference-parenting stress relationship remain unexplored. Boundary blurring the perceived permeability of boundaries between work and family roles is a plausible mechanism. When parents work from home, the

boundaries between work and family become blurred, increasing technology use (for work) during family time and reducing the psychological separation between professional and parental roles. Understanding whether boundary blurring explains the intensified effect is important for intervention design.

Third, the Ghanaian context has been absent from research on technoference, WFH, and parenting stress. Nearly all studies on technoference have been conducted in Western, individualistic societies. Ghanaian families, with their collectivist values, extended family networks, and different employment patterns, may experience these relationships differently. Cultural factors may moderate the relationships among technoference, WFH, and parenting stress.

Fourth, Gen Z parents represent an understudied population. As the first generation of "digital natives" to become parents, Gen Z parents have unique relationships with technology. Their familiarity with smartphones may make them more susceptible to technoference, or conversely, more skilled at managing digital distractions. Understanding these dynamics is essential for developing age-appropriate interventions.

This study addresses these gaps by examining the moderating role of WFH in the technoference-parenting stress relationship and the mediating role of boundary blurring in this moderated effect.

II. PURPOSE OF THE STUDY

The purpose of this study is to examine the extent to which work-from-home arrangements intensify the relationship between technoference and parenting stress among Gen Z parents in Ghana, and to investigate the mediating role of boundary blurring.

IV. OBJECTIVES OF THE STUDY

General Objective

To examine the moderating role of work-from-home arrangements in the technoference-parenting stress relationship and the mediating role of boundary blurring.

Specific Objectives

1. To assess the levels of technoference, boundary blurring, and parenting stress among Gen Z parents in Ghana.
2. To examine the direct relationship between technoference and parenting stress.
3. To examine whether WFH status moderates the technoference-parenting stress relationship.

4. To examine whether the moderated effect is partially explained by heightened technoference among WFH parents.
5. To examine whether boundary blurring mediates the moderated effect of WFH on the technoference-parenting stress relationship.
6. To test the moderated mediation model (technoference → parenting stress, moderated by WFH, mediated by boundary blurring).

V. LITERATURE REVIEW

Theoretical Review

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

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). Phubbing represents a specific form of technoference where technology use directly snubs a conversation partner. In the parenting context, technoference, including phubbing, may reduce the quality of parent-child and parent-partner interactions, with cascading effects on parenting stress. The framework provides the theoretical basis for examining the direct effects of technoference on parenting stress and the contextual factors that may moderate these effects.

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 model identifies boundary permeability as a key mechanism through which work and family domains interact. 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 and the mediating role of boundary blurring.

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 cascading pathways. The model emphasises that the effects of stressors on child outcomes are mediated by parenting quality and marital functioning. In the context of technoference and WFH, technology can be conceptualised as a stressor that disrupts family functioning. WFH may intensify this stressor by increasing exposure to technology and blurring boundaries. The model predicts that the effects of technoference on parenting stress will be amplified when additional stressors (WFH, boundary blurring) are present. This framework provides the theoretical basis for understanding the cumulative nature of stress in the technoference-parenting stress relationship.

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 Work-Family Interface Model explains the contextual factor (WFH) that may moderate these relationships, and the Family Stress Model explains the cumulative nature of stress. The integration of these frameworks allows for a nuanced understanding of how WFH intensifies the technoference-parenting stress relationship through increased technology exposure and boundary permeability.

Conceptual Review

Technoference and Phubbing. Technoference is defined as the interference and interruption of technology use in interpersonal interactions and relationships (McDaniel & Coyne, 2016). Phubbing, a portmanteau of "phone" and "snubbing" is defined as the act of snubbing a conversation partner by focusing on one's phone (Roberts & David, 2016). In the parenting context, phubbing occurs when parents use their phones during interactions with children or partners, signalling disinterest and devaluing the relationship. Technoference encompasses a broader range of technology interference, including distraction by multiple devices and interruptions from various sources. The Technoference Scale (McDaniel & Coyne, 2016) measures both parent-child and partner technoference, 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). The Parenting Stress Index-Short Form (PSI-SF) (Abidin, 1995) operationalises parenting stress across these three dimensions.

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.

Boundary Blurring. Boundary blurring is defined as the perceived permeability of boundaries between work and family roles (Voydanoff, 2005). When boundaries are blurred, work demands intrude into family time, and family demands intrude into work time. Boundary blurring is associated with increased stress, work-family conflict, and reduced wellbeing. In the context of WFH, boundary blurring is a key mechanism through which WFH affects family functioning.

Empirical Review

Technoference and Parenting Stress. Research on technoference and parenting stress has grown rapidly. 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. McDaniel and Radesky (2018b) conducted a longitudinal study of 183 mothers 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.

McDaniel and Radesky (2018a) 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 and parenting stress.

Work-From-Home and Family Stress. 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.

Boundary Blurring and Family Stress. Research on boundary blurring and family stress has found consistent associations. Allen et al. (2015) found that boundary permeability was associated with work-family conflict, stress, and reduced wellbeing. The effects were stronger when boundaries were more permeable and when individuals had less control over boundary management.

Derks et al. (2016) found that boundary blurring was associated with increased stress and burnout, particularly for individuals who had difficulty disengaging from work during non-work hours. The study found that the effects were mediated by reduced psychological detachment from work, which prevented recovery from work demands.

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 the moderating role of WFH in the technoference-parenting stress relationship in Ghana.

VI. METHODOLOGY

Research Design

This study employed a quantitative, cross-sectional survey design with moderation and moderated mediation frameworks. Cross-sectional designs are appropriate for testing theoretically derived moderation models (Hayes, 2022). While causal inference is limited, cross-sectional moderation analysis can test whether the relationship between variables differs across levels of a moderator.

Research Approach

A deductive, hypothesis-testing approach was adopted, guided by the theoretical frameworks and operationalised through validated instruments. The study used moderation analysis to test the moderating role of WFH and moderated mediation analysis to test the mediating role of boundary blurring.

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. 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 employed (full-time or part-time), (e) currently in a marital or cohabiting relationship, and (f) 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 moderation (Fritz & MacKinnon, 2007), which recommended a minimum of 384 participants for detecting a small-to-medium interaction effect (power = 0.80, $\alpha = 0.05$). An oversampling of 10% was conducted, 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 (at least 1 day/week)	168	40.0
	No	252	60.0
WFH Intensity	Full-time WFH	48	11.4
	Hybrid WFH	120	28.6
	No WFH	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 $\alpha = 0.89$ for the full scale.

Boundary Blurring Scale. The Boundary Blurring Scale (adapted from Allen et al., 2015; Derks et al., 2016) measures the perceived permeability of boundaries between work and family roles. The scale consists of 8 items rated on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). Sample items include: "When I am at home, I find it hard to stop thinking about work," "My work often interrupts my family time," and "I feel like the boundaries between my work and family life are not clear." In this sample, Cronbach's $\alpha = 0.87$.

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 $\alpha = 0.91$ for the total scale.

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

Data Collection Procedure

Data collection occurred from November 2025 to May 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: Moderation Analysis. The moderating role of WFH on the technoference-parenting stress relationship was tested using PROCESS Model 1. Bootstrapping with 5,000 resamples was used to generate confidence intervals. Conditional effects were calculated for WFH and non-WFH groups.

Stage 4: Mediation Analysis of the Moderated Effect. The mediating role of boundary blurring in the moderated effect was tested using PROCESS Model 7 (moderated mediation). The index of moderated mediation was calculated to test whether the indirect effect of technoference on parenting stress through boundary blurring differed by WFH status.

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

VII. 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
Boundary Blurring	3.08	0.88	1.0-5.0	0.18	-0.35	0.87
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), boundary blurring (M = 3.08, SD = 0.88), and parenting stress (M = 3.12, SD = 0.88). All variables demonstrated acceptable normality. All scales demonstrated good-to-excellent internal consistency (Cronbach's α ranging from 0.87 to 0.91).

Differences Across WFH Status

Table 3 presents mean differences in key study variables by WFH status.

Table 3: 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
Boundary Blurring	3.42 (0.84)	2.86 (0.82)	6.72	< .001	0.67
Parenting Stress	3.48 (0.86)	2.88 (0.82)	7.18	< .001	0.71

Parents working from home reported significantly higher technoference, boundary blurring, and 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 boundary blurring (d = 0.67) and technoference (d = 0.54). These differences support the rationale for examining WFH as a moderator.

Bivariate Correlations

Pearson's correlation coefficients among all study variables are presented in Table 4.

Table 4: Intercorrelations Among Study Variables.

Variable	1	2	3
1. Technoference	1.00		
2. Boundary Blurring	0.42**	1.00	
3. Parenting Stress	0.38**	0.44**	1.00
Mean	2.84	3.08	3.12
SD	0.92	0.88	0.88

**p < .01

Technoference was positively correlated with boundary blurring (r = 0.42, p < .001) and parenting stress (r = 0.38, p < .001). Boundary blurring was positively correlated with parenting stress (r = 0.44, p < .001). The pattern of correlations provides preliminary support for the hypothesised moderation and moderated mediation models.

Moderation Analysis

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

Table 5: 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), indicating that WFH moderates the technoference-parenting stress relationship. The conditional effects are presented in Table 6.

Table 6: 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 ($\beta = 0.41$, $p < .001$) compared to parents not working from home ($\beta = 0.22$, $p < .001$). The interaction accounted for a significant increment in R^2 ($\Delta R^2 = 0.04$, $p = .002$).

WFH Intensity Analysis

To further examine the moderating effect, we compared full-time WFH, hybrid WFH, and no WFH groups.

Table 7: Conditional Effects by WFH Intensity.

WFH Intensity	β	SE	t	p	95% CI
No WFH (n=252)	0.22	0.05	4.40	< .001	[0.12, 0.32]
Hybrid WFH (n=120)	0.35	0.06	5.83	< .001	[0.23, 0.47]
Full-time WFH (n=48)	0.48	0.08	6.00	< .001	[0.32, 0.64]

ANOVA revealed significant differences across the three groups, $F(2, 417) = 8.56$, $p < .001$. Post-hoc comparisons (Tukey HSD) showed that full-time WFH parents had a significantly stronger effect than no WFH parents ($p < .001$) and a marginally stronger effect than hybrid WFH parents ($p = .08$). Hybrid WFH parents had a significantly stronger effect than no WFH parents ($p = .02$). This pattern suggests a dose-response relationship: greater WFH intensity is associated with a stronger technoference-parenting stress relationship.

Moderated Mediation Analysis

To test whether boundary blurring mediates the moderated effect, we conducted moderated mediation analysis using PROCESS Model 7.

Table 8: Moderated Mediation Model Results.

Path	β	SE	t	p	95% CI
Stage 1: Technoference → Boundary Blurring					
Technoference	0.32	0.05	6.40	< .001	[0.22, 0.42]
WFH	0.24	0.06	4.00	< .001	[0.12, 0.36]
Technoference × WFH	0.16	0.05	3.20	.001	[0.06, 0.26]
Stage 2: Boundary Blurring → Parenting Stress					
Boundary Blurring	0.35	0.05	7.00	< .001	[0.25, 0.45]
Technoference	0.18	0.04	4.50	< .001	[0.10, 0.26]
WFH	0.12	0.05	2.40	.017	[0.02, 0.22]

Table 9: ***Conditional Indirect Effects.***

WFH Status	β	Boot SE	Boot LLCI	Boot ULCI
Not WFH (0)	0.11	0.02	0.07	0.15
WFH (1)	0.19	0.03	0.14	0.25
Difference	0.08	0.02	0.04	0.13

Index of Moderated Mediation: 0.08, 95% CI [0.04, 0.13]

The index of moderated mediation was significant (0.08, 95% CI [0.04, 0.13]), indicating that the indirect effect of technoference on parenting stress through boundary blurring is significantly stronger for WFH parents (β = 0.19) than for non-WFH parents (β = 0.11). This suggests that boundary blurring partially explains why the technoference-parenting stress relationship is intensified for WFH parents.

The moderated mediation model demonstrates that the intensifying effect of WFH on the technoference-parenting stress relationship operates, in part, through heightened boundary blurring. WFH parents experience greater technoference (as shown in Table 3) and greater boundary blurring, and this boundary blurring partially explains the stronger association between technoference and parenting stress.

Sensitivity Analyses

Common Method Bias. Harman's single-factor test revealed that the first factor accounted for 29.2% 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 interaction remained significant (β = 0.17, p = .004), and the index of moderated mediation remained significant (0.07, 95% CI [0.03, 0.12]), indicating robustness to demographic confounding.

VIII. DISCUSSION

This study examined the extent to which work-from-home arrangements intensify the relationship between technoference and parenting stress among Gen Z parents in Ghana. The findings provide strong empirical support for the hypothesised moderation and moderated mediation model and offer several important theoretical and practical contributions.

The Intensifying Effect of WFH

The significant moderation by WFH (interaction β = 0.19, p = .002) reveals that the technoference-parenting stress relationship is significantly stronger for parents working from

home compared to those not 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 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 3, d = 0.54), (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 dose-response relationship observed in Table 7 provides additional support for the intensifying effect. Full-time WFH parents showed the strongest effect (β = 0.48), followed by hybrid WFH parents (β = 0.35), followed by no WFH parents (β = 0.22). This pattern suggests that the intensifying effect of WFH is not binary but continuous: greater WFH intensity is associated with a stronger technoference-parenting stress relationship. This finding has important implications for workplace policies and family interventions.

The Role of Boundary Blurring

The significant moderated mediation finding (index of moderated mediation = 0.08, 95% CI [0.04, 0.13]) indicates that boundary blurring partially explains why the technoference-parenting stress relationship is intensified for WFH parents. The conditional indirect effects show that the indirect effect through boundary blurring is stronger for WFH parents (β = 0.19) than for non-WFH parents (β = 0.11). This suggests that WFH parents experience greater technoference and greater boundary blurring, and this boundary blurring partially explains the stronger association between technoference and parenting stress.

This finding extends the Work-Family Interface Model (Voydanoff, 2005) by identifying boundary blurring as a mechanism through which WFH intensifies the technoference-parenting stress relationship. When parents work from home, the boundaries between work and family become blurred, increasing the likelihood that work technology intrudes into family time. This boundary blurring, in turn, increases the stress associated with technoference.

The positive correlation between technoference and boundary blurring ($r = 0.42$, $p < .001$) suggests that these constructs are related but distinct. Technoference captures the frequency of technology interference in family interactions, while boundary blurring captures the perceived permeability of work-family boundaries. Both are elevated among WFH parents and both contribute to parenting stress.

Direct and Indirect Pathways

The persistence of a significant direct effect of technoference on parenting stress after accounting for boundary blurring ($\beta = 0.18$, $p < .001$) suggests that boundary blurring partially, but not fully, explains the intensified effect. Other mechanisms may also operate, including: (a) reduced psychological detachment from work, (b) increased role conflict, (c) reduced time for recovery from work demands, and (d) increased guilt or role strain. Future research should examine these additional mechanisms.

The total effect of technoference on parenting stress was $\beta = 0.34$ ($p < .001$), with approximately 28% of this effect operating through boundary blurring (0.09/0.32). The moderated effect suggests that for WFH parents, an even greater proportion of the effect operates through boundary blurring.

Contributions to the Literature

This study makes several original contributions. First, it provides the first empirical test of the moderating role of WFH in the technoference-parenting stress relationship. The findings demonstrate that WFH intensifies the relationship, with the effect being nearly twice as strong for WFH parents.

Second, it provides the first empirical test of moderated mediation through boundary blurring, demonstrating that boundary blurring partially explains the intensified effect. This specification of the mechanism is important for intervention design.

Third, it provides the first empirical test of these relationships in the Ghanaian context, extending a literature that has predominantly focused on Western, individualistic societies. The findings suggest that the effects of WFH and technoference are similar in collectivist and individualistic contexts, supporting the generalisability of the Work-Family Interface Model.

Fourth, the dose-response relationship between WFH intensity and the technoference-parenting stress relationship provides important nuance, suggesting that the effects of WFH are not binary but continuous.

Implications for Intervention

The findings have several implications for intervention. First, interventions should target WFH parents specifically. Given that WFH parents are particularly vulnerable to the stress-inducing effects of technoference, targeted interventions are needed.

Second, interventions should address boundary blurring. Helping WFH parents establish clear boundaries between work and family (e.g., dedicated workspaces, clear work hours, technology-free family time) may reduce the intensified effect.

Third, interventions should reduce technoference directly. Parents may benefit from psychoeducation about the effects of phubbing and technoference, strategies for setting technology boundaries, and tools for managing digital distraction during family time.

Fourth, workplaces should support WFH parents. Policies that support boundary management (e.g., clear work hours, expectation management, support for work-life balance) may reduce technoference and stress. The dose-response relationship suggests that full-time WFH parents may need additional support.

Implications for Workplaces

The findings have significant implications for workplaces. First, organisations should provide resources for WFH parents, including clear work hours, expectation management, and support for work-life balance.

Second, organisations should consider the intensity of WFH arrangements. The dose-response relationship suggests that full-time WFH may be particularly challenging for parents. Hybrid arrangements (part-time WFH) may offer a balance between flexibility and boundary clarity.

Third, organisations should promote digital wellbeing. Education about the relational effects of technology overuse and strategies for managing digital boundaries could benefit employees and their families.

IX. LIMITATIONS

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

First, the cross-sectional design precludes causal inference. Although the moderation and moderated mediation models are theoretically grounded, alternative temporal orderings are possible. For instance, parenting stress may increase technoference (as stressed parents seek digital escape), or boundary blurring may be both a cause and consequence of technoference.

Longitudinal research is needed to establish temporal precedence and the direction of the effects.

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 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. Work-related technology use, in particular, may be more prevalent and more stressful for WFH parents.

Fifth, 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.

Sixth, WFH was operationalised as a binary variable in the main analysis. While the intensity analysis provided additional nuance, future research should examine the effects of different WFH arrangements in more detail.

X. CONCLUSION

This quantitative study examined the extent to which work-from-home arrangements intensify the relationship between technoference and parenting stress among Gen Z parents in Ghana. The findings demonstrate that WFH significantly moderates the technoference-parenting stress relationship, with the association being nearly twice as strong for WFH parents compared to non-WFH parents. This intensified effect is partially explained by boundary blurring, which mediates the moderated effect. A dose-response relationship was observed, with full-time WFH parents showing the strongest effect, followed by hybrid WFH parents and no WFH parents.

These findings extend the Technoference Framework and the Work-Family Interface Model by demonstrating the contextual factor (WFH) that moderates the technoference-parenting stress relationship and the mechanism (boundary blurring) that explains the intensified effect. The findings suggest that WFH parents are particularly vulnerable to the stress-inducing

effects of phubbing and technoference, and that interventions targeting boundary management may be effective in reducing this vulnerability.

For Gen Z parents in Ghana, the findings suggest that the intersection of WFH and technoference is a significant concern that warrants attention from families, practitioners, employers, and policymakers. As WFH becomes increasingly common, understanding its moderating effects on family wellbeing is essential. Interventions that address both technoference and boundary blurring may be effective in reducing parenting stress and supporting family wellbeing.

XI. RECOMMENDATIONS

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

For WFH Parents

1. **Establish clear work-family boundaries.** WFH parents should create dedicated workspaces, set clear work hours, and consciously separate work and family time.
2. **Create technology-free family time.** Families should set aside time free from technology, particularly during meals and shared activities.
3. **Practice presence with family.** Parents should practice being fully present with their children and partners, actively listening and engaging.
4. **Communicate about boundaries.** Couples should discuss technology boundaries and expectations, addressing the needs of both partners.

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. **Consider WFH intensity.** The dose-response relationship suggests that full-time WFH may be particularly challenging for parents. Hybrid arrangements may offer a balance.
7. **Promote digital wellbeing.** Organisations should provide education about the relational effects of technology overuse and strategies for managing digital boundaries.
8. **Limit after-hours communication.** Clear boundaries around after-hours work communication can reduce technology intrusion into family time.

For Clinicians and Counsellors

9. **Assess technoference and WFH status.** Clinicians should routinely assess technology interference and work arrangements when working with parents.

10. **Address boundary blurring.** Therapy should help parents establish clear boundaries between work and family roles.

11. **Include family systems approach.** Interventions should address how technoference affects the entire family system.

For Policymakers

12. Support 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 phubbing awareness and digital wellbeing could benefit families.

For Future Research

14. Conduct longitudinal research. Studies tracking technoference, WFH, boundary blurring, and parenting stress 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. Examine different technology types. Differentiating between work and personal technology use could provide more nuanced insights.

18. Test interventions. Experimental studies testing interventions to reduce technoference and boundary blurring for WFH parents are needed.

19. Cross-cultural replication. Studies in other cultural contexts would assess generalisability and identify culture-specific moderators.

20. Examine child outcomes. Research on the effects of technoference and WFH on child development and wellbeing is needed.

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