Is partner phubbing equally detrimental to relationships in non-Western cultures? An Actor-Partner Model of Partner Phubbing, Mobile Phone Conflict, and Relationship Satisfaction between Romantic Partners in Liberia.

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Abstract

Using the Actor-Partner Interdependence Model, this study investigates among Liberian couples whether partner phubbing predicts relationship satisfaction, both directly and indirectly via mobile phone conflict. Moreover, this study examines whether phubbing by men is less likely to lead to conflict than that by women given the differential power relations and income distributions in Liberian romantic couples. Using data from married, cohabiting, and couples living apart (N = 128) in Liberia, a direct link was found between the phubbing behavior of women and partner's (men) relationship satisfaction. Moreover, men and women's phubbing behavior predicted their own and their partner's experience of mobile phone conflict, which in turn predicted a decrease in relationship satisfaction. Power imbalance between men and women, as well as income disparity, were found to influence some of the relationships between partner phubbing, phone conflict, and relationship satisfaction, but did not give substantial support to the hypotheses that women would elicit more conflict than men in couples characterized by high power imbalance and income inequality. Overall, the study shows the importance of examining interdependence effects in phubbing research and supports that there is meaningful cross-cultural variation that warrants further scrutinizing.

Keywords: Phubbing, Mobile Phone, Romantic Relationships, Liberia, Sub-saharan Africa, Smartphone, Power imbalance.

Introduction

If you are in a face-to-face conversation with someone whose attention seems devoted to their cell phone rather than to you, then you are being phubbed. The term phubbing is a combination of two words, "phone" and "snubbing" and is defined as the act of snubbing or ignoring someone in a social setting by looking at one's phone instead of paying attention to the person or your immediate environment (Chotpitayasunondh & Douglas, 2016; Nazir & Pişkin, 2016). The emergence of the term is a consequence of the pervasive use of mobile phones in social settings, including settings where romantic partners spend time together. When phubbing behavior occurs between romantic partners, it is referred to as partner phubbing (Roberts & David, 2016; Halpern and Katz, 2017).

The distractions caused by smartphones during romantic partners' face-to-face interactions are found to weaken romantic relationships by lowering relationship satisfaction (Halpern & Katz, 2017; Wang et al., 2017). Such distractions may be perceived as lack of care and interest and may lead to feelings of rejection (Chotpitayasunondh & Douglas, 2018), which, in turn, may lead to conflicts over mobile phone use (Halpern & Katz, 2017) with consequences on relationship satisfaction (Roberts & David, 2016). In the current study, we refer to this model that links partner phubbing to relationship satisfaction via the mediating role of conflict over mobile phone use, as the partner phubbing framework.

Several studies have provided support for the partner phubbing framework (e.g., Halpern & Katz, 2017; Krasnova, Abramova, Notter, & Baumann, 2016; Roberts & David, 2016). Nonetheless, at least two crucial questions remain: First, extant studies have focused almost exclusively on romantic partners situated in Western cultures (Halpern & Katz, 2017; Chotpitayasunondh & Douglas, 2016; Roberts & David, 2016; Wang et al., 2017). It is unclear

whether their results can be generalized to other cultures, specifically, non-Western cultures in which the relational dynamics of romantic couples can be very different (cf. Xia et al., 2006; Alesina, Giuliano & Nunn, 2013; Boyle, 2012; Jewkes, Levin, & Penn-Kekana, 2003; UNDP Human Development Indices and Indicators, 2018). Thus, the first aim of this study is to test the generalizability of the partner phubbing framework in Liberia – a country situated in Sub-Saharan Africa where the culture of patriarchalism widely exists – paying attention to how factors such as power imbalance and income disparity in the couple impacts on the strength of relationships among variables in the framework, by testing the moderating role of these factors.

A second shortcoming of extant scholarship is that, apart from a few noticeable exceptions (i.e., the studies from Bröning and Wartberg (2022) and Hipp and Carlson (2021)), mostly studies on self-report responses of only one romantic person in the couple, rather than including both partners in a dyadic analysis. Using the Actor-Partner Interdependence Model (APIM), this study accounts for the dyadic dynamics in romantic phubbing: It tests whether one partner's phubbing behavior predicts anger in the other partner about said behavior, which in turn might be associated with decreases in both partners' relationship quality. The notion of interdependence is an essential question to ask in the context of Liberian romantic relationships, because as we will explain below, the Liberian cultural context may lead to potentially differential experiences of men versus women in response to partner phubbing.

This study uses the (APIM) (Kashy & Kenny, 1999), which accounts for the interdependence of data that exists in couples and permits direct examination of partner differences (Stroud et al., 2010; Fitzpatrick et al., 2016). The model allows to separate actor

effects[1] (i.e., self-effects) and partner effects[2] (i.e., effects on one's partner) in the partner phubbing framework. We draw from the results of a paper-and-pencil survey among Liberian romantic couples (n = 128). It is important to note that the terms 'men' and 'women' and 'partner' frequently used in this manuscript refer to heterosexual couples, as non-heterosexual relationships are considered deviant and illegal in Liberia. Although they likely exist, we did not observe them in our study. We wish to explicitly acknowledge, however, that the dynamics surrounding partner phubbing may extend to various other constellations of romantic relationships.

Theoretical framework

Partner Phubbing, Mobile Phone Conflict, and Relationship Satisfaction

The prevalence of technology devices in social settings leaves interpersonal actions prone to digital interruptions, which some scholars (cf. McDaniel & Coyne, 2016; McDaniel & Drouin, 2019) have termed as 'technoference'. While technoference is broader, the urge to respond to incoming notifications (e.g., call, text message) on one's mobile phone during co-present interactions result in and can be considered phubbing (e.g., McDaniel & Wesselmann, 2021). For example, previous studies (Duran, Kelly, & Rotaru, 2011; Halpern & Katz, 2017; Roberts & David, 2016) show that the use of mobile phones during co-present interactions can lead to conflict over the partner's mobile phone use, which in turn predicts a decrease in romantic partners' relationship satisfaction. There are at least two reasons why such conflict may arise. First, phubbing may lead to feelings of ostracism (i.e., feeling ignored, excluded, and less valued) (Chotpitayasunondh & Douglas, 2018; Gonzales & Wu, 2016). Studies indeed show that

[1] An 'actor effect' can be defined as the effects of a person's own characteristics on his or her own outcomes or how much a person's current behavior is predicted by his or her own past behavior (Kenny & Ledermann, 2010).
[2] A 'partner effect' is defined as the effect of a partner's characteristics on a person's outcome or how much one person is influenced by a partner (Kenny & Ledermann, 2010).

when a conversation partner engages with their mobile phone, they essentially disengage from their physically co-present partner (e.g., Misra, Cheng, Genevie, & Yuan, 2016; Vanden Abeele, Antheunis, Schouten, 2016). As a result, that partner may feel relationally devalued (Hales et al., 2018) and experience negative affect.

Second, partner phubbing may violate expectations during interpersonal interactions. Depending on the situation they are in, people are found to have clear behavioral expectations. For example, when a phone is used in situations where a romantic partner expects undivided attention, expectancy violation may occur, leading to negative outcomes for the relationship (e.g., conflict over the phone and a decrease in relationship satisfaction; Kelly & Miller-Ott, 2017; Miller-Ott & Kelly, 2015a, 2015b).

In sum, social exclusion as a result of phubbing may lead to the experience of negative emotions such as anger, sadness, and jealousy (McDaniel et al., 2018) and lead to mobile phone conflict or arguments in the relationship over mobile phone use (Roberts & David, 2016). These conflicts, in turn, have been found to have negative consequences for romantic relationships: For example, in a study on technologies and their disruptive impact on relationship satisfaction, McDaniel and Coyne, (2014) found that the interruptions caused by technologies, including mobile phones, led to conflicts over technology use among romantic couples, with negative impact on relationship satisfaction. In the context of Partner phubbing (Pphubbing; i.e., attending to one's cell phone when in the company of your spouse or significant other), Roberts and David (2016) found that the effect of Pphubbing on relationship satisfaction was mediated by conflict over mobile phone use. Their study suggests that perceived phubbing negatively by a romantic partner affects romantic relationship but only through the experience of mobile phone conflict. Halpern and Katz (2017) replicated this model in a longitudinal study, showing that frequent

texting (i.e., Pphubbing) predicts decrease in relationship quality. More importantly, their study identified conflict within couples as a result of frequent use of mobile phones during face-to-face interactions between couples, thus, replicating the findings of Roberts and David (2016).

Adopting the APIM is an important and novel approach to study the potential influence that partners may have on one another as they display certain behaviors. According to Campbell and Kashy (2002), people in dyadic relationships often influence each other's cognitions, emotions, and behavior as a result of their emotional ties or closeness. However, most studies on partner phubbing (Roberts & David, 2016; Halpern & Katz, 2017) have only studied actor effects - thus not taking the interdependence between couples into account[3]. The studies by Bröning and Wartberg (2022) and Hipp and Carlson (2021) are notable exceptions. Bröning and Wartberg (2022) found that, among heterosexual couples, when men scored higher on avoidance, their girlfriends and wives reported being phubbed more by them. Similarly, Hipp and Carlson (2021) found that one partner's 'technoference'[4] behavior associated negatively with the other partner's relationship satisfaction. In line with these studies that use dyadic analyses to show that there is meaningful interdependence in the relationship between one partner's phubbing behavior and the emotional and behavioral responses of the other partner, the current study builds on and extends the literature, by testing the same design but in a non-Western context where the social structure is dissimilar to that in Western countries. Using the APIM we thus aim to add to the validity of the partner phubbing framework. If this framework applies to romantic relationships, we ought to

[3] An additional shortcoming of phubbing studies administered to only one partner, is that they often use indirect assessments of the phubbing behavior of one's partner, for example by asking the respondent to evaluate statements such as "My partner uses his or her cell phone when we are out together". Such assessments may already include an evaluative judgment of the partner's behavior, potentially leading to artificially inflated correlations with the respondent's self-reports of annoyance or perceived harm as a result of overlapping constructs.

[4] Technoference is a term used to describe interference by technology during everyday activities, and that is often used interchangeably with phubbing in the context of social interactions.

find, then, that there is a partner effect of phubbing on romantic partners' experiences of mobile phone conflict and their relationship satisfaction:

H1: When a romantic partner phubs their partner more frequently, this partner experiences more mobile phone conflict (see figure 1, parameter p1 < parameter a2). (H1a), and less satisfaction with the relationship (H1b).

With respect to the association between mobile phone conflict and relationship satisfaction, it is logical to assume an actor-effect in that the persons who experience the conflict are most likely to experience a decrease in relationship satisfaction. When they, however, externalize the conflict or confront the phubbing behavior through verbal means (e.g., complaining) nonverbal means (e.g., frowning, walking away), their experience of conflict may also decrease their partner's relationship satisfaction. In other words, when an experience of conflict is verbalized or expressed through some form of explicit action (e.g., withdrawal, expressive anger), their partner will experience conflict, and this may affect the partner's relationship satisfaction:

H2: The more romantic partners experience phone mobile conflict, the less satisfied they (see figure 1, parameter a5 < parameter a6) (H2a) and their partners (H2b) (see figure 1, parameter p5 < parameter p6) are with the relationship.

The full APIM for the partner phubbing framework is shown in Figure 1.

[Insert figure 1 here]

The Moderating Role of Power Imbalance and Income Inequality

There are theoretical reasons to assume that power dynamics and inequality in relationships may impact the former associations. From a theoretical point of view, Dyadic Power Theory (DPT; Dunbar, 2004) posits that relationships – especially close romantic

relationships – are characterized by power and that it is therefore a determinant of the interactions that ensue between partners. DPT explains how the authority to utilize power in interactions is often granted more to one individual than the other, among others because of societal norms such as norms related to a patriarchic organization of society (Dunbar, 2004; Dunbar, Bippus, & Young, 2008). Power is the potential to influence or control the behavior of another person and can be derived from resources such as rewards or knowledge possessed by a member of a family which serve as basis for control (Dunbar, 2004). Resources, then, refer to anything that one partner makes available to the other, helping the latter to satisfy needs or attain goals (Dunbar, 2004), and may include expert ability in tasks and access to relevant information, as well as the ability to give and withhold rewards and punishment (Rollins & Bahr, 1976). In dyadic interactions where power imbalance exists, often the less powerful person – in this case, women, adapts the "*chilling effect*"[5] and refrains from seeking conflict for fear of negative outcomes (i.e., retaliation, violence, or termination of the relationship; Dunbar, Bippus, & Young, 2008). Social Exchange Theory (SET; Emerson, 1976) additionally explains why one person in the relationship may refrain from creating conflict when their romantic partners phub them. According to SET, actors in a relationship must subscribe to the "rule" of reciprocity or repayment in kind (Cropanzano & Mitchell, 2005) which becomes a form of mutual guidelines for actors, especially those wishing to accrue some form of benefits from the other.

In Liberia, a traditional African society, there is a differential social construction of gender in the culture that affects how power is distributed in romantic couples. Power is perceived and negotiated based on social and cultural norms surrounding gender. Social norms in many African cultures, including that in Liberia, tend to promote gender inequalities that favor

[5] The chilling effect is when an individual who feels powerless or fears aggression from their partner avoids conflict by withholding grievances (Dunbar, Bippus, & Young, 2008).

men over women (e.g., Alesina, Giuliano & Nunn, 2013; Boyle, 2012; Jewkes, Levin, & Penn-Kekana, 2003). Specifically, men in Liberia are typically assigned more power and are in greater possession of financial resources, hold more powerful occupational positions compared to women, earn substantially more income than women (UNDP HDII, 2018), and are therefore relatively more able to meet the physiological needs (i.e., food, clothing, housing) of the family, thus, leading to uneven distribution of power in relationships. Following DPT and SET, this power imbalance may affect how men and women experience partner phubbing: Because men's power base is supported by society, women may be less likely to confront their partners for offenses such as when they are phubbed. This may especially be the case in situations where women are financially dependent on their partners (men), either because they are unemployed and are relegated to the role of home keeper, or because they are engaged in some unskilled work (i.e., local scale businesses or contract work known as 'petty trade') thereby lacking (to some degree) financial security[6]. This means that, in the current study, we may expect that – especially in couples where men bring in the income, or at least most of it, women may avoid confronting their partners over their phone use to avoid conflict, since it may threaten their dependency needs (e.g., men could withhold support, or threaten to terminate the relationship).

In sum, gender imbalance in power, as a result of unequal access and possessions of resources, influences women's perception of their relationships and their interactions with their partners and may therefore, affect how women perceive and respond to their partner's phubbing behavior. Specifically, the structural difference in the allocation of power, the inequality in

[6] Typically, women do business on small scale or what is locally referred to as petty trade usually because they lack financial capacity for larger investment and expansion and must also pay attention to home duties. Consequently, income from petty businesses limits women's contribution to the family income, leaving women still mostly dependent on men. However, women engaged in some business and make some contributions to household income, compared to women who stay at home or are "housewives", perceive themselves as having some power hence be considered equal with their partner.

education and income, that leaves women mostly reliant on their partner for key decisions and sustainability, may deter women from confronting their partners when being phubbed.

In the current study, we operationalize whether couples are more or less egalitarian in two ways: (1) by means of an index of the income distribution in the household (i.e., men earn or bring in almost all of the income or both partners contribute), and (2) by means of a scale measuring self-perceived power imbalance by the woman in the relationship. Based on the foregoing, the following propositions are made:

H3: Partner phubbing elicits less conflict in women than in men (see figure 1, parameter p1 < parameter p2).

H4: In couples with greater power imbalance, the relationship described in H3 is stronger than in couples with less power imbalance.

H5: In couples where the man is the sole or higher income earner, the relationship described in H3 is stronger than in couples where both partners earn an income.

Method

Sample and Participants

Using a paper-and-pencil survey, we collected data from 256 participants (i.e., 128 couples) living in the wider area of Monrovia, the capital of Liberia. Participants' age ranged from 19 to 54 years, with a mean age of 32.22 (SD = 8.16). Of the couples who participated, 30.5% were married, 42.2% were only living together or cohabiting, and 27.3% were living apart. On average, men (M = 34.59; SD = 8.27) were older than their partners (M = 29.84; SD = 7.45) ($t(127) = 11.44$, $p < .001$). The average relationship length was 6 years, but there was substantial variation between couples (M = 6.22, SD = 5.40, min = 1, max = 26, $Median$ = 4.50,

Mode = 3). Two hundred and eleven (211) or 82.4% of participants were Christians, 15.2% were Muslims, and 2.3% said they belong to other religions. of See Table 1, for more demographic information.

[Insert table 1 here]

We used convenience sampling out of financial constraint: With no public transportation system, no car ownership and no proper road infrastructure to easily transport oneself on bicycle, moving around in the broader area of Monrovia is a complex and expensive endeavor. Hence, research assistants visited homes in their immediate neighborhoods, and approached participants whom they were not personally acquainted with directly, informing them about the study. Once participants agreed to participate without any form of compensation, they received further briefing and assurance of confidentiality of their data. Participants' consents were then obtained. A research assistant was present to administer each questionnaire, as Liberia suffers from high illiteracy, and therefore it was preferred to have the research assistant (volunteer university students, blind to the study purpose) administer the survey in person.

Three inclusion criteria were used to recruit respondents: respondents had to be 18 years and above, had to be in a romantic relationship (i.e., married or cohabiting, or living apart), and both partners had to have their own mobile phones. To control for social desirability bias, respondents were interviewed independently of each other but simultaneously.

Measures

The items used for this study can be consulted in Appendix A.

Self-perceived phubbing behavior. We used two items to measure how frequently the participants phub their partner. These items were: "I keep using my phone when talking with my

partner," and "When out together with my partner I use my phone." The response options ranged from *never* (coded as 1) to *always* (coded as 5). The inter-item correlation (r = .42, p < .001) supports that these items form one construct (M = 2.39; SD =1.10). To verify the validity of this measure, we also included the original 'perceived partner phubbing scale' of Roberts and David (2016) in our study. To our surprise, our self-reported phubbing behavior only showed a moderately strong association with the perceptions of said behavior by the partner (r = .30, p < .001). In light of this observation, we also include exploratory analyses in Appendix B that include the original 'perceived partner phubbing scale' of Roberts and David (2016; Cronbach's alpha of .77).

Mobile phone conflict. We used a 9-item scale to measure conflict over mobile phone use in the relationship. Items were modeled after those used by Roberts and David (2016). Example items are "I argue with my partner about their phone use behavior," "I tell my partner that he/she interacts with their phone too much," and "I am bothered by my partner's phone use behavior when he/she doesn't tell me whom he/she was communicating with" (see Appendix A for the full item list). The response options ranged from never (coded as 1) to always (coded as 5). The reliability of the scale was good, with a Cronbach's alpha of .90 (M = 2.29; SD = 1.04).

Relationship satisfaction. We used a slightly modified version of the 12-item Quality of Marriage Index (QMI; Norton, 1983) to measure relationship satisfaction. Example items are "My partner and I have a good relationship" and "My relationship makes me feel comfortable." Response options ranged from 1 (*very strongly disagree*) to 7 (*very strongly agree*). The reliability of the scale was good, resulted in a Cronbach's alpa of .94 (M = 5.09; SD = 1.10).

Perceived power imbalance and income inequality. Two binary variables were created to serve as moderators in the model: a perceived power imbalance variable and an income inequality index.

The perceived power imbalance variable was created on the basis of four 7-point Likert scale items (1 = completely disagree; 7 = Completely agree) measuring perceived equality between men and women in the relationship ("In my relationship, my partner and I do not have equal rights," "In my relationship, my partner and I have equal rights to private communication," "In my relationship, my partner and I have equal freedom to do whatever we want," and "In my relationship, my partner has more say than I do regarding decisions that affect us"). The internal consistency of the scale comprising these four items was substantially lower among men (α = .36) than women (α = .66). Women's judgment of power imbalance in the couple correlated modestly with men's judgment (r = .36, $p < .001$). Moreover, a paired samples t-test revealed that, women experience significantly more power imbalance (M = 3.95, SD = 1.16) than their partners (M = 3.36, SD = .89; $t(127) = 5.67$, $p < .001$). Given that, in some couples, the answers of men and women were almost oppositional, we opted to derive a power imbalance measure based on women's perceptions only. Since the social structure favor men and ascribes greater power to men, their responses to the question would be biased and supportive of the social structure. For example, in their study on the perspectives of voters on women participation in politics, Lampitoc and Ignacio (2014) found that voters' response to the question of women involvement in politics was based on their experience while men's response to the question was "based on the perception of patriarchal system and the superiority of man in politics" (p. 11). Therefore, it seemed reasonable to use women's perceptions to derive the power-imbalance variable.

Couples in which women's score fell below the mean (49.2%) were assigned a value of 1 (i.e., low power imbalance) and couples in which women's score fell above the mean (50.8%) were assigned a value of 2 (i.e., high power imbalance).

We used the employment variable to create the income index. There were five response options for the employment status question: 1 = *employed*, 2 = *unemployed*, 3 = *contractor/unskilled worker*, 4 = *housewife*, and 5 = *student*. We created a binary index by assigning values to couples based on whether women are assumed to be financially dependent on men, or whether both are equal and/or women also contribute substantially to the family income (i.e., 1 = woman not financially dependent on man; 2 = woman financially dependent on man). In one third (33.6%) of the couples, women were responsible for part of the family income. This means, the woman was either employed (coded as 1) or was a contractor/skilled worker or engaged in some business activity (coded as 3) while the man was either employed (coded as 1) or was a contractor/skilled worker or engaged in some business activity (coded as 3)[7]. In this case, the woman contributed to the household needs. In 66.4% of the couples, men were identified as the main breadwinner. This means, the man was employed (coded as 1) or was a contractor/skilled worker or engaged in business activity while the woman was either unemployed (coded as 2) or was a home keeper (coded as 4) or was a student (coded as 5). In this case, the man was the main breadwinner.

Before proceeding with the analysis, we checked if a couple's assigned score for the power imbalance variable was associated with the couple's score on the income inequality index, to make sure that these constructs do not capture too much of the same underlying information. This was not the case ($X^2(1) = 1.13$, $p = .288$).

[7] From our analyses, we found no response in which woman contribute more to the family income than man. In other words, there was no couple in which the woman was employed, and the man was not.

Analysis

We analyzed the data in two steps. First, we tested whether we could replicate the model of Roberts and David (2016) while taking into account the couple data (i.e., the APIM). To that end, we restructured the data set from an individual to a pairwise dataset using Ledermann and Kenny's (2014) SPSS macro, so that "*actor*" and "*partner*" effects could be differentiated (Ledermann & Kenny, 2014) and used Structural Equation Modeling (SEM) to conduct the analyses and test the models. The mean-score variables were entered into the structural equation model as single-indicator variables (cf. Garson, 2014). The evaluation of the fit of the model was based on a number ''goodness-of-fit indices''. First, we report the X^2 –value and then the X^2/df ratio. A non-significant X^2 -value and a X^2/df ratio below 3 is considered a good fit of the model. We also report the root mean square error of approximation (RMSEA). An RMSEA value below .05 is considered a ''close fit". We also report the comparative fit index (CFI), with a CFI value above .95 indicating a ''good'' fit and a value above .90 an ''acceptable'' fit (Byrne, 2001).

In a second step, we performed multi-group analyses to examine whether the relationships in the model were moderated by perceived power imbalance and/or income inequality, using the critical ratios for differences test to examine differences in the strength of parameters in the compared groups.

Results

Descriptive Statistics and Correlation Analysis

Before testing our theoretical model, we first report some descriptive statistics on phubbing and mobile phone conflict. With respect to phubbing, respondents reported on average to use their phone only sometimes when with their partner (M = 2.39, SD = 1.10). Perceptions of one's partner's phubbing behavior were slightly, yet significantly lower (M = 2.16, SD = 0.83;

$t(255) = -.279$, $p = .006$). A paired samples t-test revealed that, men ($M = 2.58$, $SD = 1.15$) reported phubbing their partner more frequently than their partners did with them ($M = 2.20$, $SD = 1.02$; $t(127) = 3.37$, $p = .001$). Women also perceived their partners to phub them more frequently ($M = 2.28$, $SD = 0.91$) than they phubbed their partners ($M = 2.07$, $SD = 0.74$; $t(127) = -2.40$, $p = .018$). While overall there was little conflict over one's partner mobile phone use in the relationship ($M = 2.29$, $SD = 1.05$), women ($M = 2.41$, $SD = 1.08$) perceived greater conflict than men ($M = 2.20$, $SD = 1.00$; $t(127) = -2.16$, $p = .033$); women ($M = 4.96$, $SD = 1.19$) also reported being significantly less satisfied in the relationship than their partners ($M = 5.23$, $SD = 0.99$; $t(127) = 2.61$, $p = .010$).

Before fitting the APIM we first explored the correlations between the key variables of this study (see Table 2). The correlations indicate that the more women phubbed their partners, the less satisfied their partners were with the relationship ($r = -.21$, $p = .020$). This was not the case, however, when men phubbed women ($r = -.15$, $p = .101$). For both men and women, phubbing was positively related to mobile phone conflict, which in turn was negatively associated with relationship satisfaction.

[Insert table 2 here]

Testing the Actor-Partner Model (APIM) of Partner Phubbing

Our theoretical model states that phubbing predicts relationship satisfaction, both directly and indirectly, via the conflict it elicits over the mobile phone in the relationship. We tested the above hypotheses by fitting an APIM which involves distinguishable dyads (man and woman) to our data. Such a model takes into account two effects: the "actor-effect", which estimates the

extent to which the independent variable of a person influences their scores on the dependent variable; and the "partner effect", which estimates the extent to which the independent variable of a person influences the dependent variable of one's partner (Fitzpatrick et al., 2016).

We first fitted a fully saturated model. Several of the paths did not reach significance. We trimmed the model by removing non-significant paths, using a step-by-step approach exploring changes in the X^2 critical ratio for difference, which allowed us to observe the effect of the trim on other parameters (cf. Aish & Joreskog, 1990). After trimming, the fit of the model was excellent, X^2 (5) = 2.36, p = .797, X^2/df = 0.473, CFI = 1.00, RMSEA = .00. The trimmed model is shown in Figure 2.

[Insert figure 2 here]

We hypothesized that phubbing would elicit conflict over mobile phone use in one's partner (H1a). The trimmed model revealed that there was indeed a partner effect between self-reported phubbing behavior and conflict: When women reported phubbing more frequently, their men experienced significantly more conflict (β = .30, p < .001), and the same was true for women (β = .33, p < .001). Hypothesis 1a was thus supported by the data. We also found an actor-effect for both men (β = .22, p = .002) and women (β = .24, p < .001), meaning that romantic partners who phub their partner more frequently, also experience greater mobile phone conflict.

Hypothesis 1b stated that phubbing associates negatively with relationship satisfaction in one's partner. We found no support for a direct relationship for men's partner phubbing behavior on women's satisfaction (in the untrimmed model: β = -0.08, p = .497). However, we did find

that when women reported phubbing their partner more frequently, their male partners reported lower relationship satisfaction (β = -0.17, p = .028). Hypothesis 1b was thus only partially supported.

Hypothesis 2a stated that when romantic partners experience greater mobile phone conflict, their relationship satisfaction is lower. The findings support this hypothesis. Both for men (β = -.33, p < .001) and women (β = -.42, p < .001) we found a significant actor effect. Moreover, a mediation test revealed a significant mediation effect of men's phubbing on women's relationship satisfaction via the conflict that women experience over their partner's mobile phone use (b = -0.17, SE = 0.05, p = .001), the same being true for men (b = -0.14, SE = 0.06, p = .002). We did not find a partner effect for mobile phone conflict, however, suggesting that when one partner experiences the other partner's phone use as problematic, they do not experience a decrease in their relationship satisfaction (H2b not supported).

We hypothesized that because of the differential power distribution between men and women in Liberian romantic couples, women's phubbing behavior would elicit more mobile phone conflict in men than that the man's phubbing behavior would elicit in the woman (H3). Our findings show no difference in parameter strength for both partner effects (Z = -0.216, p = .414). H3 was thus not supported. Table 3 reports the unstandardized estimates for the specified relationships.

Given that our measure for self-reported phubbing correlated only moderately with Roberts and David's (2016) Partner Phubbing scale, we performed a set of exploratory analyses with the latter scale, both as a replacement and in combination with our self-reported phubbing measure. We refer the reader to Appendix B to consult the findings of these analyses.

The Moderating Role of Power Imbalance and Income Inequality

We hypothesized that power imbalance between partners, both perceived and in terms of income inequality, may impact how Liberian romantic partners experience phubbing. A table with descriptive statistics for the measures can be found in Appendix C. We ran a multi-group analysis, which allows for a comparison of parameter strengths between groups. For each of the moderators, we first fitted a fully saturated model, after which we trimmed paths that were nonsignificant in both groups. The parameter weights of the relationships in the trimmed models can be consulted in Tables 4 and 5. We explored the critical ratios for differences to examine if parameter strengths significantly differed between groups.

[Insert tables 3 - 5 here]

For the perceived power imbalance measure ($X^2(12) = 11.34$, $p = .500$, $X^2/df = 0.945$, CFI = 1.00, RMSEA = .00), the multi-group model revealed that in couples with low power imbalance, women's phubbing behavior predicted greater conflict in the man ($\beta = .32$, $p = .006$). The association between the man's phubbing behavior and conflict in his partner did not reach significance ($\beta = .22$, $p = .069$). Mobile phone conflict predicted a decrease in relationship satisfaction for both men and women (see Table 4).

In couples with high power imbalance, where women indicated having less to say in the relationship than their partners, we found a reversed pattern; here the relationship between men's phubbing and women's experience of conflict ($\beta = .42$, $p = .024$) was stronger than the relationship between women phubbing and the men's experience of conflict ($\beta = .25$, $p = .034$). While not hypothesized, we found a number of significant actor-effects. We report on these as exploratory findings. We found an actor-effect of the men's phubbing behavior on his own

experience of mobile phone conflict (β = .27, p = .024). Moreover, for the actor-effect of the women's phubbing behavior on her own relationship satisfaction we found two parameter estimates to differ significantly between the low and high-power imbalance groups: The positive association between women's phubbing behavior and their relationship satisfaction in high power imbalance couples (β = .30, p < .001) was absent in low power imbalance couples (β = .00, p =.971; Z = -3.03, p = .001). Second, the relationship between women's mobile phone conflict and their relationship satisfaction was significantly stronger in couples with a greater power imbalance (β = -.60, p < .001) than in couples with a smaller power imbalance (β = -.22, p = .039; Z = 2.19, p = .014).

We hypothesized that we would find that the difference in women and men partner effect between phubbing and conflict would be stronger in couples where there is greater power imbalance (H4). When looking at the respective parameter estimates, however, the Z-scores representing the difference between men and women partner effect are roughly equal, and do not support a difference between men and women in both couples with low power imbalance (Z = 0.83, p = .203) and high power imbalance (Z = 1.16, p = .123).

For the income inequality index (X^2 (12) = 11.34, p = .500, X^2/df = 0.945, CFI = 1.00, RMSEA = .00), we found that in couples where there is income equality there were significant partner effects of phubbing on mobile phone conflict for both men and women (see Table 6). When women experienced conflict over their partners' phone use, they also reported a decrease in relationship satisfaction (β = -.74, p < .001). That relationship was non-significant for men (β = -.16, p = .256). Moreover, we found a partner effect between mobile phone conflict and relationship satisfaction: When women experience greater conflict over their partners' phone use, these partners report lower relationship satisfaction (β = -.33, p = .025). Thus, in couples with

income equality, we find partial support for H2b. Finally, similar to what we found for couples with low power imbalance, women in equal income couples who reported phubbing their partner more frequently indicated being more satisfied with their relationship (β = .36, p = .004).

In couples where women are financially dependent on their partners, we found that the phubbing behavior of women led to conflict in men (β = .29, p = .005), but not the same for women. In line with H2a, we see an actor-effect between mobile phone conflict and relationship satisfaction for both men and women (see Table 5). Two parameters were found to differ significantly when comparing this model to that of equal income couples. First, for women who are financially dependent on their partner, mobile phone conflict was less negatively associated with their relationship satisfaction than for women who earn as much or more than their partner (-.39 versus -.74; Z = 2.50, p = .006). Second, the partner effect from women's experience of mobile phone conflict on men's relationship satisfaction was absent in couples where women are financially dependent, whereas it was not in couples that are not (.07 versus -.33; Z = 2.27, p = .023).

We hypothesized that we would find that the difference in the man and the woman partner effect between phubbing and conflict would be stronger in couples where women are financially dependent on their partner (H5). When looking at the respective parameter estimates, however, the Z-scores representing the difference between the man and woman partner effect are roughly equal, and do not support a difference between men and women in both couples with income equality (Z = 1.21, p = .113) and income inequality (Z = 0.97, p = .166).

Discussion

This study examined the relationships between partner phubbing, mobile phone conflict and relationship satisfaction among Liberian couples using an Actor-Partner Interdependence Model (APIM). The aims of the study were to examine if we could replicate the partner phubbing framework in a Liberian context, and if we could tease apart culturally meaningful actor- and partner-effects in this framework.

An important contribution of our study was its use of the APIM, which allows examining mutual influences in dyadic relationships. We found such a mutual influence in the partner effects between partner phubbing and mobile phone conflict: When men, respectively women, phub their partner more frequently, their partners were likely to experience greater conflict over that phubbing behavior. Prior studies in WEIRD countries indicate how partner phubbing can invoke feelings of jealousy and raise suspicion one's partners' infidelities (Parikh, 2007; cf. David & Robert, 2021; Frackowiak, Hilpert, & Russell, 2022; Krasnova et al., 2016). Given the prevalence of extramarital sexual relationships in Sub-saharan Africa, especially among men, (e.g., Kwena, Mwanzo, Bukusi, Achiro, & Shisanya, 2014), suspicions over a spouse's mobile phone interactions might put tremendous strain on the marital relationship (Kenaw, 2012). It may thus be that when Liberian romantic partners are phubbed by their spouse, they become jealous and suspicious of infidelity, potentially leading to greater conflict over the phubbing behavior. Future research may explore this possibility further.

We also found actor-effects in the relationship between partner phubbing and mobile phone conflict: romantic partners who phub their spouse more frequently, are themselves more likely to experience greater conflict over their spouse's phone use. Perhaps the reality of a high prevalence of extramarital relationships means that spouses who use their phone to connect with other-sex friends or partners during co-present interaction with their romantic partner are likely

to presume that their own partner may be engaging in similar acts when attending to their phone while in their presence. Moreover, recent research indicates that perceptions of phubbing behavior matter more than the actual behavior itself in eliciting an effect (Frackowiak, Hilpert, & Russell, 2022), a finding that also resonates with the overall stronger parameter strengths in the models including perceptions of 'being phubbed' (see Appendix B). Overall, we advise future research to use a longer, validated measure of self-perceived phubbing behavior, together with a matching measure for perceived partner phubbing, such as the Generic Scale of Phubbing (GSP) and the Generic Scale of Being Phubbed (GSBP) developed by Chotpitayasunondh and Douglas (2018), to gain greater clarity on the nature of both the 'phubber' and the 'phubee's' experiences in this dance of intimacy.

Interestingly, the impact of mobile phone conflict on relationship satisfaction was contingent on the power difference within couples[8]. That is, in couples with high power imbalance (i.e., relationships in which the man has more power), women who experienced conflict over their partner's phubbing behavior reported a significantly greater decrease in relationship satisfaction than women in couples with low power imbalance (i.e., relationships in which power is equal). A tentative explanation for this difference may be the fact that, although a cultural shift is taking place towards greater gender equality in romantic relationships, women in Liberia are still expected to be respectful and more submissive to their partners who must be viewed, in light of the social structure, as being the head of the family and consequently having greater power in the relationship. It is therefore likely that, especially in couples with high power imbalance, expressing conflict over one's partners' phubbing behavior is considered as

[8] The differential social construction of gender in Liberia, which borders on patriarchalism, defines how power is distributed between men and women. This leads to power imbalance that gives men more power over women, but also results to unequal income distribution which sees women generally earning less income compared to men. Hence, the power imbalance and income inequality have overlap but do not capture the same thing.

substantially more inappropriate for women, thus leading women in highly imbalanced couples to experience the conflict more internally rather than out-in-the-open, which may eat away at their relationship satisfaction more.

A second relevant difference between couples with low and high-power imbalance, was that in couples with high power imbalance the phubbing behavior of women was directly correlated with relationship satisfaction when controlling for their and their spouses' experience of mobile phone conflict. A potential explanation for this may be that, especially within high power imbalance couples, when there is no conflict over the woman's phone use, her phubbing behavior may be indicative of her partner not coercively controlling her phone use, which may be associated with her being more satisfied with her relationship (cf. Kenaw, 2012).

While women's perceptions of the power imbalance in the relationship is meaningful as it represents their lived experience, the income distribution in the couple can be considered an equally, if not more important, concrete indicator of a power difference in the relationship. This power difference is honored, especially given the harsh economic realities in Liberia, where women live on the margin compared to men due largely to inequality in employment and are thus dependent on men for their survival. We therefore assumed that, in couples with income inequality, where women live in a precarious situation of being financially dependent on their partners, men would generally face little to no risk of their partner terminating the relationship. Indeed, partner phubbing, especially men's phubbing behavior, elicited little conflict in these couples, and such conflict was associated rather weakly with the spouses' relationship satisfaction. Perhaps suspicions of infidelity and jealousy do not immediately jeopardize the relationship, given that men want to keep their marriage intact because of the negative social

stigma associated with divorce, and women because of the financial repercussions associated with it (cf. Stark, 2013).

In sum, our study suggests that social norms defining women's and men's acceptable role behavior, responsibilities, and dependencies in the romantic relationship account for results found. Future studies need to further explore these issues, however, ideally by combining survey research with a qualitative research approach, to gain in-depth understanding of the underlying mechanisms that influence spousal behavior and experiences relative to partner phubbing. Our findings indicate that the theoretical premises of Social Exchange and Resources theories, that posit that possession or access to resources legitimize power and that dependent parties follow reciprocity norms, provide a promising starting ground for such further investigation.

Our findings hold some practical significance: Firstly, the need for women empowerment is paramount. Organizations concerned about gender equality need to go beyond street advocacy for women's rights and instead seek ways to empower women through skills training and job creation initiatives, but also by being sensitive to how power differences may play out into relational dynamics, among others involving the mobile phone. By adopting such a holistic approach, women may not only gain financial independence, but also gain more agency in relationships, including equal opportunity to access and interact with mobile phones. Secondly, and related, our study highlights the need for media literacy among couples. Social institutions (e.g., churches, mosques, schools) can directly and indirectly educate and sensitize couples on the importance of appropriate uses of smartphones and other technologies, in ways that strengthens rather than weaken relationships. Counsellors working with couples will do well to provide mutually acceptable guidelines for smartphone use to prevent the experience of conflict

over phone use which may impact relationships negatively with consequences for society in general.

This study was not without limitations, one being that the scale for measuring power imbalance in couples performed differently for men and women, and – even when relying on women's responses only - did not reach the desired degree of internal consistency (Cronbach Alpha = .66 which is below the commonly accepted threshold of .70). This finding indicates that the reliable and valid measurement of (perceived) power imbalance in couples, especially in self-report surveys, warrants further attention. Future research on this issue might consider the role that culture plays in relation to how power imbalances are manifested and experienced in couple relationships, as in some cultures non-equality may be more normative than in others.

Related, it was unexpected that the power imbalance measure did not associate with the income index. One explanation for this result may be that the index income represents a more 'factual' measure of women's potential to live an independent life, but that this objective reality does not bear relation to the subjective experiences of women subjected to the socio-normative structures of Liberia. In other words, the lived experiences of women may exist independently from women's capacity to contribute financially to the household. A second, related possibility, is that our index measure captures employment more so than the actual financial contributions made to the household income. Because women are often involved in 'petty trade' work, their relative contribution may still be smaller than that of their partner, thus not invoking enough 'impact' to generate a shift in how women perceive the power imbalance in their relationship. Future research should explore these issues further by looking more closely at relevant markers for power imbalance and income inequality in different cultural contexts.

Another limitation is that the study sample could have been more generalizable to the entire Liberian population. Respondents lived in the greater area of Monrovia, the capital of Liberia, which can be said to be a largely westernized area, especially compared to the smaller cities outside the capital. Since a main goal was to investigate the potential influence of power imbalance and income inequality, a more heterogeneous sample could potentially reveal a different picture. Nonetheless, as one of the first studies on partner phubbing in the context of romantic relationships in the sub-Saharan region, this study presents a promising new avenue for research on the social implications of mobile technology use in a currently understudied region.

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Table 1

Sample Composition

	Men	*Women*	*Total*
N (%)	128 (50%)	128 (50%)	256 (100%)
Age	34.59 years (SD = 8.27)	29.84 years (SD = 7.45)	32.22 years (SD = 8.16)
Religion			
Muslim	23 (18%)	16 (12.5%)	39 (15.2%)
Christian	99 (77.3%)	112 (87.5%)	211 (82.4%)
Other	6 (4.7%)	/	6 (2.3%)
Education			
No degree	2 (1.6%)	8 (6.3%)	10 (3.9%)
Primary School	2 (1.6%)	5 (3.9%)	7 (2.7%)
Secondary School	7 (5.5%)	15 (11.7%)	22 (8.6%)
High School	44 (34.4%)	62 (48.4%)	106 (41.4%)
University	73 (57%)	38 (29.7%)	111 (43.4%)
Employment			
Employed	63 (49.2%)	39 (30.5%)	102 (39.8%)
Unemployed	23 (18%)	24 (18.8%)	47 (18.4%)
Contractor/Skilled Worker	21 (16.4%)	12 (9.4%)	33 (12.9%)
Housewife	/	22 (17.2%)	22 (8.6%)
Student	21 (16.4%)	31 (24.2%)	52 (20.3%)
Income			
no income	4 (3.1%)	12 (9.4%)	16 (6.3%)
$1 to $100	23 (18.0%)	42 (32.8%)	65 (25.4%)
$105 to $500	18 (14.1%)	4 (3.1%)	22 (8.6%)
$505 to $1000	23 (18.0%)	16 (12.5%)	39 (15.2%)
$1000 above	7 (5.5%)	4 (3.1%)	11 (4.3%)
don't know/prefer not answer	53 (41.4%)	50 (39.1%)	103 (59.8%)

Note: A contractor is one who either operates a small business or is occasionally hired, to for example work in construction labor.

Table 2

Correlation table

		1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1	Men's Frequency of Phubbing	1							
2	Men's Perception of Women's Phubbing	.35***	1						
3	Men's Experience of Mobile Phone Conflict	.25***	.71***	1					
4	Men's Relationship Satisfaction	-.14	-.43***	-.38***	1				
5	Women's Frequency of Phubbing	.31***	.33***	.37***	-.21*	1			
6	Women's Perception of Men's Phubbing	.26**	.28**	.19*	-.18*	.20*	1		
7	Women's Experience of Mobile Phone Conflict	.33***	.28**	.35***	-.18*	.27**	.72**	1	
8	Women's Relationship Satisfaction	-.15	-.18*	-.12	.44***	-.01	-.53***	-.43***	1

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 3

Parameter weights for the trimmed model

Predicted variable		*Predictor variable*	*Beta*	*b*	*SE*	*Sig*
Men's mobile phone conflict	<---	Men's partner phubbing	0.22	0.22	0.09	.009
Women's mobile phone conflict	<---	Men's partner phubbing	0.33	0.38	0.09	<.001
Women's mobile phone conflict	<---	Women's partner phubbing	0.24	0.30	0.10	.003
Men's mobile phone conflict	<---	Women's partner phubbing	0.30	0.35	0.10	<.001
Men's relationship satisfaction	<---	Men's mobile phone conflict	-0.33	-0.33	0.07	<.001
Women's relationship satisfaction	<---	Women's mobile phone conflict	-0.42	-0.45	0.08	<.001
Men's relationship satisfaction	<---	Women's partner phubbing	-0.17	-0.20	.09	.028
Error Term Correlations						
		Partner phubbing	.20*			
		Experience of conflict	.21*			
		Relationship Satisfaction	.41***			

Note: * p < .05, ** p < .01, *** p < .001

Table 4

Error term correlations and parameter weights for paths in the multi-group model on the basis of women's perceived power imbalance (low versus high)

			Low power imbalance				High power imbalance			
Predicted variable		*Predictor variable*	*Beta*	*b*	*SE*	*Sig*	*Beta*	*b*	*SE*	*Sig*
M' experience of conflict	<---	Freq. of M' partner phubbing	0.09	0.07	0.10	.476	0.27	0.24	0.11	.024
W' experience of conflict	<---	Freq. of M' partner phubbing	0.23	0.19	0.11	.069	0.42	0.41	0.11	<.001
M' experience of conflict	<---	Freq. of W' partner phubbing	0.32	0.33	0.12	.006	0.25	0.23	0.11	.034
M' relationship satisfaction	<---	M' mobile phone conflict	-0.41	-0.44	0.11	<.001	-0.31	-0.29	0.10	.006
W' relationship satisfaction	<---	W' mobile phone conflict	**-0.22**	-0.23	0.11	.039	**-0.60**	-0.70	0.11	<.001
W' relationship satisfaction	<---	Freq. of W' partner phubbing	**0.00**	0.00	0.12	.971	**0.30**	0.36	0.11	<.001
Error Term Correlations										
		Partner phubbing		.27*				.34*		
		Mobile Phone Conflict		.34**				.17		
		Relationship Satisfaction		.53***				.38**		

Note: M' = men's, W' = women's. Beta parameters printed in bold are significantly different: * p < .05, ** p < .01, *** p < .001

Table 5

Correlations and parameter weights for paths in the multi-group model on the basis of income equality (women's equal/higher income versus men's higher income)

			Equal Income couples				Unequal income couples			
Predicted variable		*Predictor variable*	*Beta*	*b*	*SE*	*Sig*	*Beta*	*b*	*SE*	*Sig*
W' mobile phone conflict	<---	Freq. of M' partner phubbing	0.41	0.33	0.11	.004	0.16	0.15	0.10	.132
W' mobile phone conflict	<---	Freq. of W' partner phubbing	0.28	0.26	0.13	.051	0.18	0.20	0.12	.101
M' mobile phone conflict	<---	Freq. of W' partner phubbing	0.58	0.52	0.11	<.001	0.29	0.30	0.11	.005
M' relationship satisfaction	<---	M' mobile phone conflict	-0.16	-0.17	0.15	.256	-0.44	-0.42	0.09	<.001
W' relationship satisfaction	<---	W' mobile phone conflict	**-0.74**	-0.90	0.16	<.001	**-0.39**	-0.42	0.11	<.001
M' relationship satisfaction	<---	W' mobile phone conflict	**-0.33**	-0.34	0.15	.025	**0.07**	0.06	0.09	.502
W' relationship satisfaction	<---	Freq. of W' partner phubbing	0.36	0.41	0.14	.004	0.10	0.12	0.11	.297
Correlations										
		Partner phubbing		.48**				.21		
		Mobile phone conflict (error terms)		-.02				.30**		
		Relationship Satisfaction (error terms)		.40*				.46***		

Note: M' = men's and W' = women's . Beta parameters printed in bold are significantly different: * p < .05, ** p < .01, *** p < .001

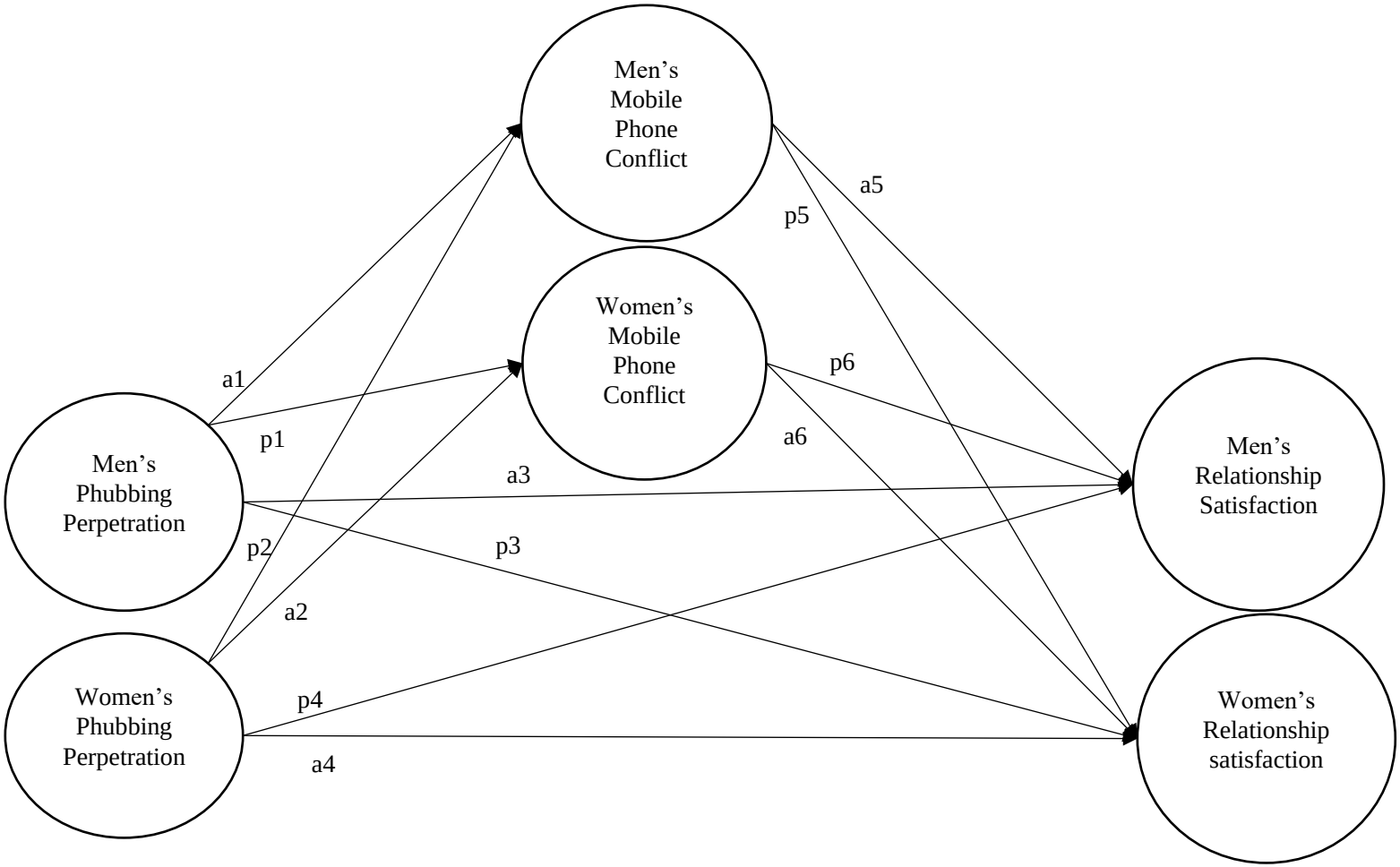

Figure 1. An Actor-Partner model of the partner phubbing framework. p = partner-effect; a = actor-effect.

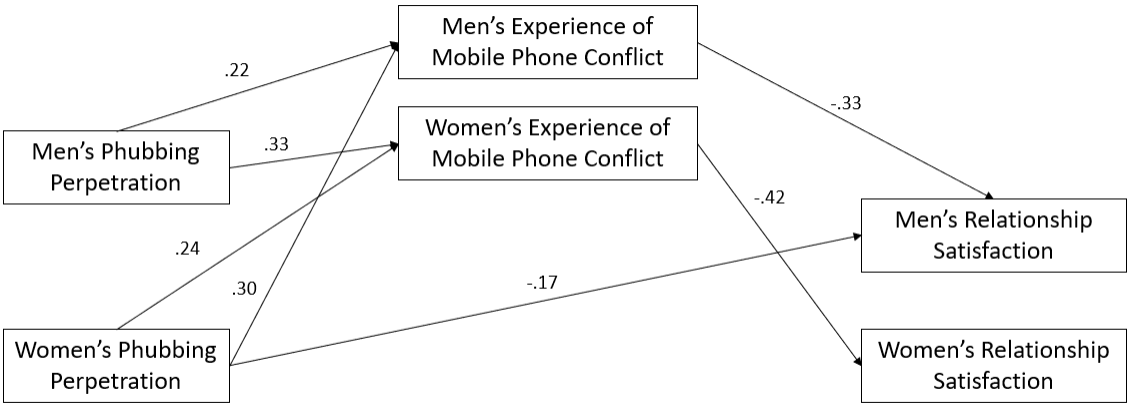

Figure 2

Trimmed model