EMOTIONS THAT PREDICT INTIMATE PARTNER VIOLENCE AMONG WOMEN AND MEN

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A Dissertation

Presented to

The Faculty of the Department

of Psychology

University of Houston

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In Partial Fulfillment

Of the Requirements for the Degree of

Doctor of Philosophy

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By

Johannah M. Sommer, M.A.

May, 2017

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ABSTRACT

Although maladaptive communication and Intimate Partner Violence (IPV) have consistently been associated, higher-order communication factors and dyadic statistical approaches are needed to examine how violent partners communicate. Furthermore, evidence continues to suggest high rates of bilateral violence, a form of IPV where both partners initiate violence perpetration, but little is known about factors maintaining bilateral violence in these relationships. The current study sought to use factor analysis to explore how violent couples communicate using the Specific Affect (SPAFF) coding scheme, and how communication is related to physical assault perpetration and bilateral physical assault using the Actor-Partner Interdependence Model (APIM). Community-recruited violent couples (n = 258) completed violence questionnaires and engaged in a conflict discussion. Confirmatory Factor Analysis (CFA) results did not confirm the existing four-factor structure of SPAFF. Instead, exploratory factor analysis (EFA) found support for a six-factor structure for men and a four-factor structure for women. Men and women had one shared Aggression factor (comprised of Defensiveness, Contempt, and Belligerence) that was used to predict physical assault in APIM models. Models found couple-level support for the Aggression factor for men and women, and their interaction, being associated with physical assault perpetration and bilateral violence. Results highlight the potential efficacy of individual and conjoint treatments for IPV that target negative communication behaviors and affect.

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Introduction

Intimate partner violence (IPV) is a serious and prevalent problem. It includes physical (e.g., slapping, grabbing, punching), psychological (e.g., yelling, put-downs), and sexual violence (e.g., rape, coercion for sexual acts) toward a current or previous romantic partner (Center for Disease Control and Prevention, 2017). In the United States, over 10 million men and women are victims of IPV within a given year (Center for Disease Control and Prevention, 2017), and nearly 1 in 4 women (22.3%) and 1 in 7 men (14%) have been victims of severe physical violence by a romantic partner in their lifetime (Breiding, 2015).

Unfortunately, current battering intervention and prevention programs are ineffective at reducing recidivism (Arias, Arce, & Vilariño, 2013; Babcock, Green, & Robie, 2004). One explanation may be that few programs have directly addressed bilateral violence within relationships, although there has been growing evidence of the phenomenon (Bates, 2016; Langhinrichsen-Rohling, Misra, Selwyn, & Rohling, 2012). Furthermore, although studies have identified maladaptive communication behaviors between partners to be associated with IPV, few have examined this relation in a dyadic fashion (Sommer, Iyican, & Babcock, 2016).

Evidence of Bilateral Violence

Bilateral violence is a phenomenon where both partners in a romantic relationship initiate violence perpetration, and there is not a clear male-to-female or female-to-male pattern of violence. It is associated with more prevalent and severe mental health outcomes (e.g. suicide, depression, substance use) than unilateral violence (Temple, Weston, & Marshall, 2005; Ulloa & Hammett, 2016). Although the topic is controversial,

comprehensive literature reviews have identified that bilateral violence is a common occurrence in romantic relationships (Bates, 2016; Langhinrichsen-Rohling et al., 2012). Several authors argue that among community samples, women seem to perpetrate IPV at similar or even higher levels than men (Cho, 2012; Dutton & Corvo, 2007; Dutton, Hamel, & Aaronson, 2010; Langinrichsen-Rohling, 2010). Others argue that this may be due to women being more likely to use violence as a form of self-defense (Gondolf, 2012; Hamberger & Larsen, 2015), or are more likely to report IPV in general (Caetano, Schafer, Field, & Nelson, 2002). Ultimately, more comparison studies are needed to identify mechanisms of violence in these relationships and to explore similarities or differences between men and women (Bates, 2016). Furthermore, it is especially important to study IPV and associated factors within the context of the couple, given the inherently dyadic nature of IPV (Bartholomew & Cobb, 2011).

Since men and women both cite communication difficulties as their own primary motivation for violence perpetration (Elmquist, Hamel, Shorey, Labrecque, & Ninnemann, 2014), it seems appropriate to examine dyadic communication behaviors and their relations to violence perpetration for women and men. Communication studies suggest similarities in expressions of behaviors used by men and women during conflict discussions in the laboratory (Coan, Gottman, Babcock, & Jacobson, 1997). Perhaps comparing communication of men and women when taking into account their interdependence in romantic relationships can provide necessary information for the debate about gender differences in violence perpetration. A couple-level perspective on communication within the relationship may provide higher-level information about how violence is maintained in these relationships.

Observational Research and Couples

Relationship researchers commonly observe couples' interactions to assess the quality of their communication. Arguments in the research laboratory share similarities in the content of natural discussions at home (Gottman, 1979; Heyman, 2001), and researchers have demonstrated that communication behaviors observed in the laboratory can be reliably coded (Heyman et al., 2001). Specifically related to the study of violence and the obvious ethical limitations involved with bringing violent couples into a laboratory setting and studying their perpetration of violence, the most often used research strategy is to have couples discuss topics of relationship conflict. These marital interactions of conflict discussions are able to capture the relationship dynamics and communication behaviors of violent couples and to serve as an ethical proxy for studying violence, the assumption being that there are continuities between predictors of psychological abuse and physical assault (Murphy & O'Leary, 1989).

Specific Affect Coding. A popular coding system that identifies specific communication behaviors is the Specific Affect Coding System (SPAFF; Gottman, McCoy, Coan, & Collier, 1996). SPAFF is a microanalytic coding strategy that identifies specific behavior bids at the construct level instead of at the level of discrete behaviors (Gottman et al., 1996), thereby capturing the observed function of the communication bid within the context of the interaction. SPAFF categorizes 16 communication behaviors based on vocal tone, body language, facial behavior, and verbal content to describe how partners communicate (Coan & Gottman, 2007). Observable SPAFF behaviors include contempt, belligerence, defensiveness, domineering, disgust, anger, fear, stonewalling, sadness,

whining, neutral, validation, interest, humor, affection, and joy (Coan & Gottman, 2007). Refer to Table 1 for a description of SPAFF behaviors.

Due to statistical power constraints associated with examining 16 behavioral SPAFF codes, researchers commonly collapse the codes into smaller-order clusters or factors (Babcock, Graham, Canady, & Ross, 2011; Rehman et al., 2011). Common groupings are "positive" and "negative" (Carrère & Gottman, 1999; Gottman, Levenson, Swanson, Swanson, Tyson, & Yoshimoto, 2003; Rehman et al., 2011), which have not been empirically established as SPAFF factors. Although dividing behaviors into positive and negative groups makes sense at face value, it may be a method that fails to capture the nuances of these behaviors. For instance with this method, the negative code of sadness, a code for passive, submissive, and tearful behavior, is also grouped with the negative code of contempt, a code for hateful and belittling behavior. The communication functions of sadness and contempt are vastly different, suggesting that they are qualitatively different (Johnson, 2002). Sommer, Iyican, and Babcock (2016) examined SPAFF codes of anger and contempt in relation to IPV, and they found differences in each code's individual-level and partner-level associations with physical assault. Thus, grouping codes like these together in analyses of communication behavior may lead to false conclusions, especially since the positive and negative groupings have never been supported in factor analytic studies of SPAFF.

Only two studies have derived empirically-supported SPAFF factors for the full set of SPAFF codes (Johnson, 2002; Waldinger, Schulz, Hauser, Allen, & Crowell, 2004). It is important to note that inherent properties of the SPAFF coding system pose challenges for factor analytic studies (Johnson, 2002). Within the coding system, behaviors are coded in

exclusion of other codes. Therefore, no two codes can co-occur in a given moment for an individual. This is potentially problematic for factor analysis, since one assumption is that the observed variables can co-occur as a way to identify their shared variance, and thus, identify their relation within a higher-order factor. This may account for the surprisingly few factor analytic studies of one of the most commonly used observational coding systems for couples. However, researchers have addressed this issue by coding the *intensity* of observed behaviors within discrete time points (Johnson, 2002; Waldinger et al., 2004), allowing for more shared variance.

Johnson (2002) approximated factor analysis of the full SPAFF Version 1.0[1] (Gottman, 1994) by using the Behavioral Affective Rating System (BARS; Johnson, Johns, Kitahara, Ono, & Bradbury, 1998), a Likert-type rating scale of the intensity of all SPAFF codes within 30-second intervals. The BARS accommodated the assumption that observable variables were allowed to co-occur, which allowed researchers to conduct a factor analysis on the BARS to approximate SPAFF factors. However, the BARS excludes codes of whining and interest, and there were also other adjustments made to codes for the purpose of the analysis. The codes of interest/curiosity and anticipation/surprise/excitement/enjoyment/joy were combined a priori, and the codes of anger and contempt were divided into defensiveness, verbal aggression, scorn, and frustration. Although Johnson (2002) found support for four factors: Anger/Contempt, Affection/Humor, Anxiety, and Hurt, the modifications made to codes and the presence of a

[1] The original version of SPAFF had nine behavior codes: Anger, Disgust/Scorn/Contempt, Whining, Fear, Sadness, Neutral, Humor, Affection/Caring, and Interest/Curiosity. In subsequent versions, including SPAFF Version 1.0, contempt was considered a separate code, and belligerence, domineering, stonewalling, defensiveness, surprise, and validation were added to the set of behavior codes. Version 1.0 was later revised to the current version (Coan & Gottman, 2007), which is used in the present study.

more updated version of SPAFF still leave open questions about the psychometric properties of the current coding scheme.

Waldinger and colleagues (2004) also found support for four SPAFF factors: Hostility, Empathy, Affection, and Distress. See Table 2 for the Waldinger et al. (2004) factor loadings. They used a similar technique as Johnson (2002) by coding the intensity of behaviors within 30-second epochs, but they differed in that Waldinger et al.'s (2004) analysis utilized the most current version of SPAFF (Gottman, Coan, & McCoy, 1996). While their findings had some similarities to Johnson (2002), they also resulted in some different factors. Waldinger et al.'s (2004) Hostility and Affection factors resembled Johnson's (2002) Anger/Contempt and Affection/Humor factors, respectively. However, Johnson's (2002) Anxiety and Hurt factors were captured within the single Distress factor in Waldinger et al.'s (2004) results. Waldinger et al.'s (2004) fourth factor of Empathy was not present in Johnson's (2002) findings. The findings are limited due to a relatively small sample size (47 couples). Thus, replicating Waldinger et al.'s (2004) findings with a larger sample will strengthen support for their four-factor model.

Communication and IPV

Dysfunctional communication within romantic relationships appears to be associated with various relationship problems, including IPV (Mirgain & Cordova, 2007; Simpson, Doss, Wheeler, & Christensen, 2007). In fact, certain forms of maladaptive communication can be considered psychological abuse (e.g. contempt), and studies have shown an association between psychological abuse and physical violence in romantic relationships (Murphy & O'Leary, 1989). Specific behaviors have been examined in relation to relationship conflict and IPV, and they will be outlined here.

Several studies have compared the communication patterns of domestically violent, distressed non-violent, and happy non-violent couples (Babcock, Waltz, Jacobson, & Gottman, 1993; Berns, Jacobson, & Gottman, 1999; Holtzworth-Munroe, Smutzler, & Stuart, 1998), and have found that domestically violent couples were more likely than the other groups to engage in maladaptive communication patterns. Specifically, both spouses in relationships with a violent husband are not only engaged in more low-level negative communication behaviors like sadness, anger, or complaint, but they also engage in even more aversive negative behaviors like contempt, belligerence, or defensiveness (Coan et al., 1997; Jacobson, Gottman, Waltz, Rushe, Babcock, & Holtzworth-Munroe, 2000) as compared to relationships with nonviolent men. Ultimately, it is the higher-level negative/aggressive behaviors that may distinguish between violent and nonviolent relationships, suggesting these behaviors may need to be specifically targeted in IPV interventions.

Furthermore, researchers have found that physically abusive relationships have worse communication patterns than verbally aggressive or non-violent couples (Berns et al., 1999; Margolin, John, & Gleberman, 1988). They found that physically aggressive husbands used more negative voice and overt negative behaviors than verbally aggressive and withdrawing husbands, and that the wives of violent husbands escalate conflict during non-violent discussions (Margolin et al., 1988). When examining specific communication behaviors, another study found physically aggressive husbands to engage in more demands, contempt, and belligerence compared to non-violent husbands (Berns et al., 1999). Although high rates of maladaptive communication behaviors have been observed for partners in violent relationships at an individual level, evaluation at this level of analysis may be too simplistic.

Instead, it is necessary to also take into account the relation between communication and violence at the dyadic level.

Many studies have found that both partners in violent relationships engage in negative communication behaviors (Babcock et al., 1993; Burman, Margolin, & John, 1993; Cordova, Jacobson, Gottman, Rushe, & Cox, 1993; Jacobson et al., 2000; Noller & Roberts, 2002). Burman and colleagues (1993) found that both partners in physically aggressive relationships reciprocate hostile affect and engage in anger-related behaviors during verbal conflicts at home. Similarly, other studies have found that wives of violent husbands actually reciprocate negative behaviors and escalate verbal arguments (Cordova et al., 1993; Jacobson et al., 2000). When both partners in violent relationships engage in poor communication, there is a greater likelihood of more severe violence (Babcock et al., 1993; Simpson et al., 2007). In contrast, positive behaviors may protect couples conflicts from escalating to violence. In a sample of non-violent couples, Driver and Gottman (2004) found positive behaviors like humor and affection to reduce verbal conflict. Since increasing positive behaviors led to a reduction in verbal conflict, it may also reduce the escalation of verbal conflict to physical abuse. Low positivity and high hostility for both partners in violent relationships are evident, even when only one partner has been identified as violent. Thus, greater understanding of communication dynamics and potential communication training for both partners is warranted.

Although the aforementioned studies conceptually examine couple-level communication and violence, they lack sophisticated dyadic statistical techniques that take into account shared variance between romantic partners. The Actor-Partner Interdependence Model (APIM; Kenny, 1996) was developed to parse out the unique and independent

individual effects (actor effects) and the effects dependent upon the other partner (partner effects). This method treats the couple as the unit of analysis, so it has gained popularity in couples' research (Burr, Hubler, Larzelere, & Gardner, 2013; Knee, Lonsbary, Canevello, & Patrick, 2005; Rodriguez, Knee, & Neighbors, 2014; Rodriguez, Overup, & Neighbors, 2013). Surprisingly, the APIM model has rarely been applied to violent couples (e.g. Maneta, Cohen, Schulz, & Waldinger, 2013; Sommer, Babcock, & Sharp, 2017; Sommer, Iyican, & Babcock, 2016). By using the APIM model on violent couple samples, IPV researchers may be able to identify dyadic factors that contribute to violence perpetration. Further, this model allows for a better understanding of the distinct individual and partner factors that maintain IPV, and it can test for gender differences in effects. To our knowledge, only three studies have used APIM to understand the relation between communication and IPV (Crane & Testa, 2014; Hammett, Castañeda, & Ulloa, 2015; Sommer, Iyican, & Babcock, 2016).

Interestingly, Hammett and colleagues (2015) found that a husband's dissatisfaction with problem-solving communication in the relationship was associated with his own IPV victimization, suggesting the husband's lack of skills to resolve problems may be associated with IPV perpetration by frustrated wives (Hammett et al., 2015). They also found that a husband's dissatisfaction with communication of emotional intimacy in the relationship was associated with higher rates of his wife's IPV victimization, suggesting that husbands dealt with their dissatisfaction through IPV perpetration (Hammett et al., 2015). This study provides valuable information on the dyadic interplay between partners' communication and IPV, but it is not without weaknesses. Specifically, this study used participants' self-report of communication satisfaction. Objective measures of partners' communication during

conflict discussions would provide alternative information, especially since self-report measures are vulnerable to distortions. Second, emphasis on IPV perpetration, as opposed to IPV victimization, would have been a more direct way to examine the association between one's own communication behaviors and violence behaviors.

Crane and Testa (2014) used a prospective 8-week daily diary method of examining the effects of anger experienced by both partners on IPV. They found that both actor and partner anger preceded IPV perpetration. They also found that the interaction of increased levels of anger for both partners was associated with increased IPV perpetration only for women. Their results provide important information on the causality of aggressive affective experiences on IPV perpetration when taking into account the interdependence of both partners. Another strength of their approach was to examine interaction effects of affective communication on IPV and potential gender differences in effects. However, Crane and Testa (2014) acknowledged study limitations of the demographic homogeneity (94.1% Caucasian) and low IPV variability (M = .03, SD = .27 for men, and M = .06, SD = .34 for women) of their sample, and that they used self-report measures of affect and IPV perpetration that are vulnerable to distortions. Furthermore, self-reported affective reports were limited to experiences of anger (irritated, angry, angry with partner), anxiety (anxious), and depressed mood (sad), and did not include affect known to be more strongly associated with IPV (i.e. contempt; Coan, Gottman, Babcock, & Jacobson, 1997; Jacobson et al., 2000).

Sommer et al. (2016) addressed these concerns in a dyadic study of select observed communication behaviors in association with physical assault perpetration. Specifically, they found observed contempt to be associated with one's own physical assault perpetration and that of their partners, while observed anger was only associated with one's own physical

assault perpetration. While interesting for targeting specific behaviors for intervention, these effects were not examined within the context of the full range of communication behaviors observed in the lab. Thus, future studies may benefit from including additional SPAFF behaviors within the same analysis.

Gender differences. There is much controversy in the field related to gender differences in prevalence rates and functions of violence (Gondolf, 2014; Straus, 2014). Although both sides acknowledge growing evidence of similarities in the rates of violence perpetration between men and women, they address different issues to explain these findings. The traditional feminist perspective purports that the rates of violence perpetration are similar between men and women due to women's use of self-defense in response to violence being considered as similar to men's initiation of IPV (Gondolf, 2012). Though few studies have directly compared men's and women's motivations for violence (Langhinrichsen-Rohling, McCullars, & Misra, 2012), there is evidence that women are sometimes violent for reasons other than self-defense (Babcock, Miller, & Siard, 2003; Elmquist et al., 2014).

According to a communication study of husband-to-wife violence (Jacobson et al., 2000), men and women showed some differences in their relations between observed communication behaviors and reports of violence. Specifically, while wives in violent and non-violent relationships and violent men demonstrated similar rates of contempt and belligerence, violent and non-violent husbands differed. Specifically, violent husbands were twice as likely to express these behaviors in the laboratory as non-violent husbands (Jacobson et al., 2000). Since women's perpetration was not a target of the study, it is unclear how the communication behaviors relate to women's physical violence. However, it is interesting to note that most women in this sample were also violent, although inclusion

criteria selected for husband-to-wife violence only. Therefore, women's level of IPV perpetration may have been a confound of the study since it was not included in the analysis. Moreover, the interdependence and function of men's and women's emotions on their own and their partners' violence perpetration was left unexamined.

The function of male violence has been theoretically conceptualized as a physical method for intimidation and control (Hamberger, 1997), especially when the man's control is threatened. A female partner's use of hostility toward the male partner may be experienced as particularly threatening to his power and control. Thus, one could argue that the male partner uses physical violence as a method to re-establish his power status (Hamberger, 1997). It remains largely unexamined how hostility is related to women's perpetration of violence. Ross and Babcock (2009) found the majority of couples in their violent sample to have mutual IPV perpetration between men and women, and that women were more likely to display hostility in the laboratory. They also found no association between the woman's report of her violence and her outward hostility observed in the lab, whereas men's report of his violence was strongly associated with his observed hostility (Ross & Babcock, 2009). Perhaps the woman's hostility was also associated with the man's perpetration of IPV; however this was not tested. Given societal and cultural norms for male power (Connell, 1987) and patriarchal attitudes toward violence (Pence & Paymar, 1993), the relation between one partner's hostility and the other partner's violence may be stronger for men.

Regarding expressions of fear or anxiety, there are no studies suggesting links with the behavior and one's own violence perpetration. However, fear has been noted in association with IPV victimization. Only wives of domestically-violent husbands expressed fear during nonviolent conflict discussions (Jacobson et al., 2000). These findings suggest

that male violence produces fear in the female partner, supporting the patriarchal belief system of male power and control as a mechanism of IPV perpetration (Jacobson et al., 2000). A review has also found gender asymmetry with women experiencing more fear related to IPV victimization, compared to men (Caldwell, Swan, & Woodbrown, 2012).

An examination of positive communication behaviors suggests a protection against IPV. In a sample of husband-to-wife violent couples, Babcock et al. (2011) found that two brief communication interventions administered to the man had simultaneously increased positive affect (composite of validation, humor, interest, affection, and joy) and decreased aggressive affect (composite of belligerence, domineering, contempt, and disgust). This pattern was similar for both men and women even though only men received the intervention, suggesting an interdependent benefit of the communication interventions. Driver and Gottman (2004) found the use of positive communication bids to reduce verbal conflict, a behavior known to be associated with physical abuse (Murphy & O'Leary, 1989). Thus, it is expected that the benefits of positive communication behaviors against partner violence may be similar for men and women.

Taken together, findings from previous studies suggest a strong relation between maladaptive communication behaviors in partners and violence perpetration at the individual level. In particular, behaviors associated with hostility and fearfulness are likely to be identified in violent relationships, and positive behaviors are likely to buffer against violence perpetration. Regarding gender differences, a female partner's hostility and fearfulness expressions may be more strongly associated with the male partner's violence perpetration than the opposite gender pattern of emotion expression and violence. However, more research is needed to understand how violent partners communicate, if certain patterns of

communication behaviors are related to physical assault perpetration among violent partners when taking into account interdependence between them, and if men and women differ in their relation between communication and violence perpetration. Three previous studies used sophisticated statistical measures, but they had weaknesses in their reliance on self-report (Crane & Testa, 2014; Hammett et al., 2015) or lacked inclusion of a full range of SPAFF codes (Sommer et al., 2016).

Current Study

The current study has two major aims. First, it aims to reduce the number of observed communication behavior variables into empirically-supported factors using the most current version of SPAFF (Gottman et al., 1996) with a large sample of violent couples. The factors are expected to resemble the Hostility, Distress, Affection, and Empathy factors observed in Waldinger et al.'s (2004) factor analysis. Second, it aims to explore how these factors relate to physical assault perpetration by using dyadic statistical techniques. Hostility is expected to be positively associated with one's own violence perpetration and perpetration of the other partner, with this effect being stronger for men compared to women. Distress is not expected to be related to one's own violence perpetration, but it is expected to be related to the other partner's physical assault perpetration. This effect is expected to be stronger for women's distress and men's IPV. Empathy and Affection are expected to be negatively associated with one's own and their partner's perpetration of IPV, and these effects are not expected to differ for men and women.

Hypotheses

The current study has two major aims: (1) to reduce SPAFF data into meaningful latent factors, and (2) to explore the factors' relations to IPV, including the perpetration of

bilateral violence. The specific Aim 2 Hypotheses that were tested depended on the results of the Aim 1 Hypothesis.

Aim 1. Data Reduction of SPAFF.

Hypothesis 1. Through confirmatory factor analysis of SPAFF, it is predicted that four communication factors will emerge, resembling Waldinger et al.'s (2004) factors of Hostility, Distress, Affection, and Empathy.

Aim 2, Part 1. Dyadic Association of Factors on IPV.

The following a priori hypotheses were planned to be used if support was found for Hypothesis 1:

Hypothesis 2. Hostility will be positively associated with one's own physical assault perpetration (actor effect) and the other partner's physical assault perpetration (partner effect).

Hypothesis 3. Distress will not be associated with one's own physical assault perpetration (actor effect), but it will be associated with the other partner's physical assault perpetration (partner effect).

Hypothesis 4. In contrast, Affection will be negatively associated with one's own physical assault perpetration (actor effect) and the other partner's perpetration (partner effect).

Hypothesis 5. Empathy will be negatively associated with one's own physical assault perpetration (actor effect) and the other partner's perpetration (partner effect).

Aim 2, Part 2. Dyadic Associations of Factors on IPV and Bidirectional Violence

Hypothesis 6. Bilateral violence will be positively associated with hostility and negatively associated with affection and empathy for men and women.

The following alternative set of hypotheses were used for the present study when no support was found for Hypothesis 1:

Aim 1. Data Reduction of SPAFF.

***Hypothesis 1A*.** If Hypothesis 1 is not supported, an exploratory factor analysis will be conducted separately for men and women for SPAFF data reduction. The resulting factors will be used for testing subsequent hypotheses related to Aim 2.

Aim 2, Part 1. Dyadic Association of Factors on IPV.

Hypothesis 2. An exploratory APIM test will be conducted of the association between the resulting overlapping SPAFF factor(s) for men and women and physical assault perpetration.

Aim 2, Part 2. Dyadic Associations of Factors on IPV and Bidirectional Violence.

Hypothesis 3. An exploratory dyadic test will be conducted of the association between the independent variables (i.e. resulting overlapping SPAFF factor for men and women and their SPAFF factor product score) and the dependent variables (i.e. physical assault perpetration for men and women and bilateral violence).

Methods

Participants

Community couples (N = 340) were recruited through local newspaper advertisements and flyers stating "Couples experiencing conflict needed to participate in a research study." For eligibility, participants had to be 18 years of age, married or living together as if married for at least six months, heterosexual, and able to speak and write

English proficiently. Trained undergraduates administered a telephone screening interview of a modified version of the Revised Conflict Tactics Scale (CTS-2; Straus, Hamby, Boney-McCoy, & Sugarman, 1996) and the Dyadic Adjustment Scale (DAS; Spanier, 1976) to the female partners to determine eligibility for the study. Couples were included if they reported at least two incidents of aggression in the past year, or reported moderate to severe levels of relationship distress with no accompanying aggression between partners during the telephone screening. Moderate to severe levels of relationship distress were determined by a score less than 4 out of 7 on item 31 of the DAS, where 1 is "very unhappy", 4 is "happy", and 7 is "perfectly happy" with the present relationship.

Couples (n = 82) were excluded for missing data.[2] Excluded cases did not statistically differ from couples included in the present analyses by race, age, income, or composite scores of physical assault perpetration. Therefore, 258 violent and non-violent couples were included in the present analyses. Men's average age was 31.37 (SD = 9.74), and women's average age was 29.32 (SD = 9.05). Mean gross family income was approximately $37,500 per year ($SD$ = 40,221.22). The median education level was some college. The sample was predominantly comprised of African-American/Black (43.6%), White (29.84%), and Hispanic (16.09%) participants. Asian (3.49%), Native American (.58%), or Other (4.26%) participants comprised a smaller proportion of the sample, and remaining participants chose not to answer the question related to race (2.13%).

Questionnaire Measure

[2] Forty of the cases excluded for the present analyses did not attend the second assessment session that involved the female partner. Twenty-two of the remaining excluded couples did not complete the conflict discussion task, where SPAFF data were collected, and twenty couples had at least one partner that did not complete the IPV questionnaire.

Intimate Partner Abuse. Men and women separately completed the Revised Conflict Tactics Scale (CTS-2; Straus et al., 1996), a 78-item questionnaire that is frequently used in IPV research to assess partner violence within the last year. Respondents identify how often a violent act occurred during the previous year by marking that it has happened once, twice, 3-5 times, 6-10 times, 11-20 times, more than 20 times, not in the last year but before, or never. Items on the CTS-2 are paired, asking what action the target person did and what action their partner did. Examples of items include "I have pushed or shoved my partner" and "My partner has sworn or yelled at me." The subscales of intimate partner abuse on the CTS-2 are physical assault, psychological aggression, injury, negotiation, and sexual coercion. Physical assault was specifically studied in the present study. Internal consistencies for the CTS-2 range from $\alpha = .79$ to .95 (Straus et al., 1996). In the current study the internal consistency for the physical assault scale was $\alpha = .85$ for self-report and $\alpha = .82$ for partner report across men and women.

Observed Measure of Affect

Specific Affect Coding System. Conflict discussions were coded on a second-by-second basis by a team of coders using the Specific Affect Coding System (SPAFF; Gottman, McCoy, Coan, & Collier, 1996). SPAFF is a microanalytic coding strategy that identifies specific behavior bids at the construct level instead of at the level of discrete behaviors (Gottman et al., 1996), thereby capturing the observed function of the communication bid within the context of the interaction. SPAFF categorizes 16 communication behaviors based on vocal tone, body language, facial behavior, and body content to describe how partners communicate (Coan & Gottman, 2007). Observable SPAFF behaviors include contempt, belligerence, defensiveness, domineering, disgust, anger, fear,

stonewalling, sadness, whining, neutral, validation, interest, humor, affection, and joy (Coan & Gottman, 2007). SPAFF is considered to have good evidence of construct and criterion validity (Heyman, 2001).

Teams of three to four trained undergraduate coders for each of the three larger studies identified SPAFF behaviors by coding videotaped interactions of participants engaging in a conflict discussion in the laboratory. Coders were trained on the SPAFF coding manual (Gottman et al., 1996) and were required to demonstrate competence on group practice training videos and live observation. Acceptable inter-rater reliability was established, with a minimum kappa of .70. Kappa coefficients of reliability for specific codes averaged .89 (range .70 - .97). Twenty-five percent of the tapes were used to compare undergraduate codes to a trained reliability coder to establish reliability. Weekly meetings were held to review SPAFF and to discuss any problems or questions that may have arisen related to coding. The conflict discussions were coded using the Video Coding Station (Long, 1998), which allows data entry synchronized with the video time code.

Procedures

Questionnaire and observational data for the current study were collected from three larger studies on emotion regulation in domestically violent and distressed non-violent couples. Informed consent from participants was obtained prior to participation, and the study protocols had been approved by the institutional review board where the studies took place. For all studies, male and female partners attended a three-hour assessment session together and completed a conflict discussion. Both partners were separately administered a series of questionnaires, including a modified version of the Knox Problem Solving Inventory (Knox, 1971) asking participants to independently rank how much difficulty they

experience with common relationship topics associated with marital discord. Subsequently, participants were administered the Play-by-Play Interview (Hooven, Rushe, & Gottman, 1996) in order to identify an appropriate area of conflict for the conflict discussion. Due to slight differences in study design between the second and third study, couples participated in a 15-minute conflict discussion (study 1 and 2) or 7.5-minute conflict discussion (study 3). Psychophysiological measures of heart rate and skin conductance were collected during the conflict discussion. Following the conflict discussion, couples were separately interviewed about their history of relationship violence before being reunited for debriefing and payment. Couples were paid $90 to $100 for their participation.

Data Analytic Strategy

The current study utilized the IBM Statistical Package for the Social Sciences (SPSS, Version 24) and Mplus (Version 7) for all analyses.

Preliminary Analyses. Variables were planned to be transformed if they possessed a non-normal distribution. Means, standard deviations, and correlations among all study variables were identified. Additionally, tests of gender differences in observed SPAFF variables and physical assault perpetration were conducted.

Primary Analyses.

Aim 1. For the purpose of data reduction of SPAFF, a principal axis confirmatory factor analysis (CFA) was used. This method was selected in order to extract the maximum amount of variance, and thus, all meaningful theoretical communication behavior factors from the observed conflict discussion. The goal of the factor analysis is to identify meaningful groupings of behavior for the full range of SPAFF codes, so an orthogonal rotation was used to identify distinct groupings of behaviors. Log-transformed scores of the

proportion of time engaged in SPAFF behaviors during the conflict discussion for participants were entered into the factor analysis. Recommended fit indices (Bollen & Long, 1993) of chi-square (χ^2), root mean square error of approximation (RMSEA), and comparative fit index (CFI) were used[3]. When the four-factor structure (Waldinger et al., 2004) was not confirmed (unsupported Hypothesis 1), a maximum likelihood exploratory factor analysis was conducted to reduce the data into meaningful factors (Hypothesis 1A) to be used for Aim 2 analyses. Preliminary tests of item correlations, Kaiser-Meyer-Olkin measure of sampling adequacy, and Bartlett's test of sphericity were used to identify EFA efficiency.

Aim 2, Preliminary Analyses. Since self-reports of violence are commonly underreported (Hamby, 2005; Riggs, Murphy, & O'Leary, 1989; Sugarman & Hotaling, 1997), a composite score average of self- and partner-report of the target's violence was created and utilized for the dependent variables as modeled by Sommer, Iyican, and Babcock (2016). Both men and women's composite violence scores and communication behavior factor scores were entered into APIM models to test the actor and partner effects of negative communication factors that are associated with male and female perpetration of physical assault. Due to the nature of APIM, couples were dropped from the analyses if at least one partner had missing CTS-2 data or if partners did not participate in the conflict discussion task (n = 82).

Rates of unilateral and bilateral violence of the sample were identified, and preliminary tests of interdependence between the variables of interest for dyadic tests were conducted. Specifically, a preliminary test of bivariate correlations among the variables of

[3] A non-significant chi-square suggests a good fit to the data (Cole, 1987). An RMSEA value of 0.05 suggests a close fit and values up to 0.08 represent reasonable errors of approximation in the population (Browne &

the shared SPAFF factors for men and women (Aggression Factor) and scores of physical assault perpetration was conducted. Tests of distinguishability were also conducted for the Main Effects and Interaction models, testing whether analyses should be run separately for men and women. Chi-square comparison of model fit between the model where effects for men and women are free to vary and the model where effects are constrained to be the same were used to test for distinguishability for the models. If the models are not significantly different, the simpler model where effects are constrained to be the same, will be interpreted. Otherwise, the complex model where parameters are free to vary will be interpreted. All variables were grand-mean centered before APIM analyses.

Aim 2, Part 1. The resulting communication behavior factor scores from Hypothesis 1A results were used in the SEM version of the APIM model as predictor variables for the outcomes of physical assault perpetration.

Aim 2, Part 2. Additionally, a dyadic model of communication behaviors on IPV that includes bilateral violence as a dependent variable was tested. Namely, the overlapping factor for men and women elucidated from the results of Hypothesis 1A (Aggression) and their product score were used as independent variables for three physical assault violence outcomes (male perpetration, female perpetration, and interaction of male and female perpetration). The product score of male and female physical assault perpetration represents bilateral violence in this analysis.

Results

Preliminary Analysis

Prior to all analyses, a test of data normality was conducted. It was identified that all SPAFF codes (exception "neutral") and IPV had positive skew and required log

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Cudeck, 1993). CFI values greater than 0.90 suggest adequate fit (Bentler, 1990).

transformations. Thus, log transformations were performed on all relevant variables, and was found to impose a more normative distribution on the data to be used in subsequent analyses.

A MANOVA used to examine gender differences on all study variables found significant differences between men and women, $F(17, 498) = 2152.23$, $p < .001$. Results of univariate tests are listed in Table 3. An examination of univariate effects found significant gender differences in expressions of Belligerence, Contempt, Anger, Domineering, Whining, and Sadness, where women were observed engaging in higher levels compared to men. There were no statistically significant differences for composite-scored physical assault between men and women, or for observed Defensiveness, Fear/Tension, Stonewalling, Disgust, or Neutral. Regarding positive SPAFF behaviors, there were no significant differences on Affection, Validation, Interest, Humor, or Joy between men and women.

Primary Analysis

Aim 1, Data Reduction of SPAFF.

The factor structure of the observed communication behaviors as measured by SPAFF was investigated as a test of Hypothesis 1 using the principal axis CFA model of the four-factor SPAFF structure (Waldinger et al., 2004). Poor model fit was observed [$\chi^2(71) = 420.22$, $p < .0001$, RMSEA =.10, CFI = .63]. Therefore, Hypothesis 1 and confirmation of the Waldinger et al. (2004) SPAFF four-factor model was not supported, and test of Hypothesis 1A was indicated. Hence, subsequent a priori hypotheses resulting from a support of Hypotheses 1 were not tested.

The 16 SPAFF items were subjected to a maximum likelihood exploratory factor analysis (EFA) separately for men and women in order to identify any latent or underlying

dimensions within the items. Prior to performing the EFAs, the data were tested for applicability of the procedure. Several significant correlations among SPAFF variables provide preliminary support for exploratory factor analysis, as demonstrated in Table 4. For men and women, all 16 SPAFF variables correlated at least .3 with at least one other item, suggesting reasonable factorability. Kaiser-Meyer-Olkin and Bartlett's Tests also demonstrated support for EFA efficiency. The Kaiser-Meyer-Olkin measure of sampling adequacy was .523 for men and .605 for women, which is considered adequate (Kaiser, 1974). Bartlett's test of sphericity was also significant for men [$\chi^2(120) = 664.306$, $p < .001$] and women [$\chi^2(120) = 632.262$, $p < .001$]. Due to low communalities, Disgust (.052) was dropped from the male SPAFF factor analysis, and Whining (.083), Joy (.045), Fear/Tension (.077), and Disgust (.081) were dropped from the female SPAFF factor analysis. Thus, maximum likelihood exploratory factor analyses of the remaining 15 SPAFF variables for men and the remaining 12 SPAFF variables for women were conducted separately.

EFA rotations were derived empirically. An oblimin rotation possessed factor correlations less than .3 for men and women, as demonstrated in Tables 5 and 6, respectively. Thus, a varimax rotation was considered appropriate. For men, six factors had initial eigenvalues above one. The first factor explained 16.77% of the variance, the second factor 11.81% of the variance, the third factor 10.10% of the variance, and the fourth factor 9.18% of the variance. The fifth and sixth factors had eigenvalues just over one, explaining a combined 15.02% of the variance. Results for Hypothesis 1A found support for a six-factor structure for men, explaining 62.89% of the total variance. Table 7 shows the factor loadings for men.

Factor 1 for men, which we labeled Aggression, included the variables of Defensiveness, Contempt, Belligerence, and Neutral (negative loading). Factor 2, labeled Passion, included the variables Joy, Affection, and Interest. Factor 3, labeled Friendship, included Validation, Humor, and Contempt (negative loading) variables. Factor 4, labeled Passivity, included Neutral, Fear/Tension, and Domineering (negative loading) variables. Factor 5, labeled Stonewalling, only included the Stonewalling variable. The final Factor 6, labeled Despair included Whining and Sadness.

Table 8 shows the factor loadings for women. Five factors had initial eigenvalues above one. The first factor explained 24.09% of the variance, the second factor 11.99% of the variance, the third factor 11.27% of the variance, the fourth factor 9.41% of the variance, and the fifth factor 8.60% of the variance. Results for Hypothesis 1A for women found support for a four-factor structure, explaining 56.75% of the variance. Four factors were identified for its theoretical support of 'leveling off' of eigenvalues on the scree plot after 4 factors and the ability to interpret the resulting factors.

For women, Factor 1—labeled Aggression—was comprised of Defensiveness, Contempt, Belligerence, and Neutral (negative loading) SPAFF variables. Factor 2, labeled Respect, included Validation, Interest, and Contempt (negative loading) variables. Factor 3, labeled Domineering, included the Domineering and Neutral (negative loading) variables. The final Factor 4, labeled Emotional Lability, included Anger, Sadness, Stonewalling, and Belligerence variables.

Aim 2, Preliminary Analyses.

The majority of the sample reported experiencing some level of IPV within the last year. Based on study measures of violence, thirty-three couples (12.8%) were considered

non-violent, fifteen couples (5.8%) engaged in unilateral male-perpetrated violence, twenty-two couples (8.5%) engaged in unilateral female-perpetrated violence, and 188 couples (72.9%) engaged in bilateral physical violence.[4]

Factor loadings for the shared Aggression factor between men and women identified with results from Hypothesis 1A were used to develop weighted Aggression scores to be used for the remaining APIM tests. Factor scores were developed within SPSS by creating a weighted sum of the products of the scoring factor coefficients and the subject's standardized scores on the original variables of interest. Using factor scores was considered preferable for the APIM analyses, due to the ability to retain power and for the ease of creating product scores for the APIM regressions testing Hypothesis 3.

Bivariate correlations among partners' Aggression factor scores and physical assault demonstrate non-independence. Correlations are reported in Table 9, where correlations for men are displayed above the diagonal, correlations for women are displayed below the diagonal, and absolute agreement intraclass correlations (ICCs) between men and women are displayed along the diagonal. Men demonstrated significant correlations between the Aggression factor score and physical assault ($r = .220$, $p < .001$), and women also had significant correlations between the Aggression factor score and physical assault ($r = .247$, $p < .001$). Men and women also demonstrated high correspondence for Aggression factor scores ($r = .755$, $p < .001$) and physical assault ($r = .777$, $p < .001$), demonstrating statistical interdependence between partners and support for the APIM analysis.

[4] Composite scores of physical assault perpetration were used to identify direction of violence rates. Non-violent couples were identified when both partners had male and female composite scores of physical assault perpetration at zero. Unilaterally violent couples were identified when one partner had physical assault perpetration scores above zero, and the other partner had a score of zero. Bilaterally violent couples were identified when both partners had physical assault perpetration scores greater than zero.

Results from the tests of distinguishability indicated that men and women should be considered indistinguishable for the Main Effect model, but as distinguishable for the Interaction model. When Main Effect model parameters were constrained to be the same for men and women, the model fit was not significantly different from the baseline model, $\chi^2(2, N = 258) = 1.964$, $p = .375$. The simpler model where parameters for men and women are constrained to be the same was interpreted for the Main Effect model. In contrast, when Interaction Model parameters were constrained to be the same for men and women, the model fit worsened significantly, $\chi^2(4, N = 258) = 24.236$, $p = .0001$. Thus, men and women were treated as empirically distinguishable by allowing parameter estimates to be free to vary across gender for the Interaction model.

Aim 2, Part 1, Dyadic Association of SPAFF Factors on IPV (Main Effects Model).

The Main Effects model included male and female Aggression factor scores as predictor variables for composite-scored male and female physical assault. See Figure 1. This model tests how an individual's Aggression scores are associated with their own physical assault scores (actor effects), and how an individual's Aggression scores are associated with the other partner's physical assault scores (partner effects). Due to results from the distinguishability test, parameter estimates were constrained to be the same for men and women. The results for the effects are presented in Table 10 and Figure 2. Regarding Hypothesis 2 actor effects, results suggest that one's own Aggression score was significantly associated with their own physical assault score ($b = 3.783$, standard error [*SE*] = .965, $z = 3.920$, $p < .001$). Regarding results of partner effects for Hypothesis 2, an individual's

Aggression score was associated with the other partner's physical assault score (b = 2.174, SE = .939, z = 2.314, p = .021).

Aim 2, Part 2, Dyadic Associations of SPAFF Factors on IPV and Bilateral Violence (Interaction Model).

The Interaction Model included male and female Aggression factor scores and their interaction as predictor variables for outcome variables of male and female physical assault and bilateral physical assault. See Figure 3. In addition to testing the main effects of an individual's Aggression on their own or their partner's physical assault, this model also tests how the interaction of partner's Aggression scores is related to unilateral and bilateral violence. It also simultaneously tests how an individual's Aggression scores are related to the perpetration of bilateral violence.

The results for the Interaction Model effects (Hypothesis 3) are presented in Table 11 and Figure 4. Actor effects within this model were significant for the effect of male Aggression on male physical assault perpetration (b = 3.153, SE = 1.586, z = 1.988, p = .047), and for female Aggression on female physical assault perpetration (b = 5.385, SE = 1.956, z = 2.753, p = .006). Partner effects were significant for female Aggression on male physical assault perpetration (b = 3.268, SE = 1.495, z = 2.186, p = .029), but not for male Aggression on female physical assault perpetration (b = 2.688, SE = 2.076, z = 1.295, p = .195). The interaction effect of male and female Aggression was significantly associated with male physical assault (b = 4.180, SE = 1.328, z = 3.147, p = .002), female physical assault (b = 3.874, SE = 1.738, z = 2.229, p = .026), and bilateral physical assault (b = 29.767, SE = 9.610, z = 3.098, p = .002). Additionally, female Aggression was associated with bilateral physical assault (b = 27.966, SE = 10.816, z = 2.568, p = .010), but male

Aggression was not associated with bilateral physical assault (b = 10.693, SE = 11.478, z = .932, p = .352).

Tests of simple slopes examined the association between Aggression scores and physical assault perpetration at high (+1 *SD*) and low (-1 *SD*) levels of the other partner's Aggression scores (Aiken & West, 1991). The Johnson-Neyman technique (Johnson & Neyman, 1936) was also used to identify more specific regions of significance in addition to the simple slopes method. As shown in Table 12 and Figure 5, male Aggression was positively related to male physical assault when female Aggression was high (p = .001), but not when female Aggression was low (p = .80). The Johnson-Neyman technique showed that the relationship between male Aggression and male physical assault was significant when female Aggression was greater than .001 standard deviations below the mean, as shown in Figure 6. As shown in Table 13 and Figure 7, female Aggression was positively related to female physical assault when male Aggression was high (p < .001), but not when male Aggression was low (p = .35). More specifically, the Johnson-Neyman technique showed that the relationship between female Aggression and female physical assault was significant when male Aggression was greater than .36 standard deviations below the mean, as demonstrated in Figure 8. As shown in Table 14 and Figure 9, male Aggression was positively related to bilateral physical assault when female Aggression was high (p = .01), but not when female Aggression was low (p = .27). However, a more specific examination of the regions of significance with the Johnson-Neyman technique found that male Aggression was significantly negatively related to bilateral physical assault at very low (1.681 *SD* below the mean) levels of female Aggression and positively related to bilateral

physical assault above moderate (.49 *SD* above the mean) levels of female Aggression, as shown graphically in Figure 10.

Discussion

The current study extends previous work examining couples communication behaviors and IPV among a large diverse community sample of distressed and violent couples. To our knowledge, this is the first study to examine how forms of objective communication used by distressed and violent couples are associated with bilateral physical assault perpetration using dyadic statistical approaches. Aggression (i.e. Contempt, Belligerence, Defensiveness, and non-Neutral) was one factor of maladaptive communication that was consistent across gender. Entering Aggression into an APIM model without interactions, men and women have similar effects of the association between their Aggressive behaviors and their own perpetration of physical assault and their partner's perpetration of physical assault. However, when the interaction of Aggressive behaviors observed in the lab and bilateral violence were included in the model, results differed for men and women. Men's physical assault was predicted by his own Aggression, his wife's Aggression, and the interaction of his and his wife's Aggression. In contrast, women's physical assault was only predicted by her Aggression and the interaction of male and female Aggression. Although causal claims cannot be made due to the cross-sectional nature of the current study, results imply that men may be reactive to women's Aggression but women are not reactive to men's Aggression. Cultural norms of masculine aggression and men's experiences of disrespect when traditional gender norms are violated by female Aggression could explain these associations (Connell, 1987; Hamberger, 1997; Pence & Paymar, 1993).

Of most interest due to use of the novel statistical approach for examining the relation between objective communication and IPV, the interaction of male and female Aggression observed in the lab was positively associated with male IPV, female IPV, and bilateral IPV when both men and women demonstrated high Aggression. Ultimately, the partner matching of maladaptive communication predicted worse violent outcomes, suggesting that these relationships may be particularly insidious (Mirgain & Cordova, 2007; Simpson et al., 2007). These results also offer support for Langhinrichsen-Rohling's (2010) bilateral IPV typologies: dyadic domination, dyadic dysregulation, and dyadic/reciprocal couple violence. Pairing of partners with characterological traits of power and control, borderline or emotional dysregulation traits, or low skills to manage situational stressors associated with social and cultural gender and violence norms could dyadically predict bilateral physical assault (Langhinrichsen-Rohling, 2010). However, additional research is needed to make these claims beyond the theoretical level. There was also a negative association between Aggression and Bilateral IPV when male Aggression was low and female Aggression was very low, implying that couples with low Aggression may have the skills to manage situational relationship conflict that buffer them against bilateral IPV (Bradley et al., 2012; Stith, Rosen, McCollum, & Thomsen, 2004). The fact that directionality of the Aggression interaction effects on bilateral IPV changed at low versus high levels of Aggression highlights the potential treatment benefits of specifically targeting Aggressive communication behaviors as one mechanism for enhancing IPV treatment with situationally-violent couples.

Hammett and colleagues (2015) suggested that male partner's self-report of low communication skills to resolve problems was associated with their own IPV victimization

and that male partner's self-reported low communication satisfaction was associated with their wife's victimization. Results from the current study also suggest that having low communication skills, as demonstrated by observational measures of Aggressive affect during a conflict discussion, was associated with IPV. However, results from the current study suggest that low communication skills by both partners and not just by men was associated with IPV perpetration. It's also possible that men's IPV perpetration as a result of low communication satisfaction (Hammett et al., 2015) was also related to frustration with women displaying more Aggressive affect, a violation of cultural and patriarchal norms of women being more submissive (Connell, 1987; Hamberger, 1997; Pence & Paymar, 1993). Similarly, results from the current study interaction model that female Aggression was associated with male IPV and bilateral IPV but male Aggression was not associated with female IPV or bilateral IPV may be explained by men's low communication satisfaction when female partners violated communication gender norms (Connell, 1987; Hamberger, 1997; Pence & Paymar, 1993).

The current study expanded on existing findings by Sommer and colleagues (2016) by attempting to examine the full range of SPAFF codes in relation to dyadic IPV perpetration. Due to findings from the current study EFA, there was one factor (Aggression) that could be examined within the APIM model in relation to IPV. Although the full range of SPAFF codes was not able to be simultaneously examined in relation to IPV, the current study was able to explore how three SPAFF codes comprising the Aggression factor were related to IPV. Furthermore, the current study extended findings by Sommer et al. (2016) by testing for interaction effects of communication behaviors on unilateral and bilateral IPV perpetration. Sommer et al. (2016) found male and female expressions of Contempt to be

associated with one's own and the other partner's physical assault perpetration. Similar results were found in the current study, as the Aggression factor included Contempt. However, upon examination of interaction effects within the present study, there were gender differences in the relation between Aggression and IPV. Perhaps Sommer et al. (2016) would have found gender differences in the relation between Contempt and IPV if the interaction of male and female Contempt had been included in their model.

Combined with results from Crane and Testa (2014), results from the current study suggest that affective aggression precedes physical assault perpetration, and that gender matters. The current study addressed limitations acknowledged by Crane and Testa (2014) by using a comparatively more ethnically diverse sample with more IPV variability, and it also used objective measures of a more broad range of affective communication. Both studies emphasize the importance of examining the relation between affect and IPV dyadically, and that female verbal aggression may be a stronger predictor of multiple forms of violence than male verbal aggression.

Current study results contribute to findings on female IPV perpetration and growing rates of bilateral violence. The current study used composite violence scores taking into account both partner's reports of the target person's violence perpetration. Composite scores of violence help to address the concern that women are more likely to report violence in general compared to men (Caetano et al., 2002). The current study's results suggest that men and women perpetrate IPV at similar rates, consistent with epidemiological studies of rates of IPV perpetration in community samples of violent couples (Langhinrichsen-Rohling et al., 2012). This is particularly surprising given that these data come from a larger study in which couples were recruited solely based on their report of male-to-female IPV within the past

year. In other words, male-to-female violence was part of the inclusion criteria, but female-to-male violence was free to vary. Furthermore, women were more likely to be observed engaging in negative affect (i.e. Belligerence, Contempt, Anger, Domineering, Whining, and Sadness) compared to men, similar to results found by Ross and Babcock (2009). However, others have found men and women in violent relationships to express similar rates of negative affect (Jacobson et al., 2000). It is possible that the current study's diverse sample may account for the gender differences observed.

A comparison of result differences between the Main Effect and Interaction models in the current study highlights how statistical approaches can significantly impact results and may explain the occurrence of mixed findings for the debate on IPV gender differences. The Main Effect model found no differences in effects for men and women. Yet the Interaction model found significant differences between men and women. On the surface, female Aggression seems to drive the model, as it is associated with unilateral and bilateral IPV. However, probing of interaction effects elucidates how the shared Aggressive characteristics of both men and women are related to unilateral and bilateral IPV, and it may be women's Aggression combined with men's violent reactions to those gender norm violations that are maintaining IPV in these relationships. Thus, examination of effects at the couple level or systems level provides different information than an examination of effects at the individual level or Main Effects level. Results from the current study highlight the importance of using sophisticated dyadic approaches in order to capture accurate information on couples processes (Bartholomew & Cobb, 2011).

Ultimately, APIM findings are consistent with existing studies that have found both partners in violent relationships to engage in negative communication behaviors (Babcock et

al., 1993; Burman, Margolin, & John, 1993; Cordova, Jacobson, Gottman, Rushe, & Cox, 1993; Jacobson et al., 2000; Noller & Roberts, 2002) and to reciprocate hostile affect (Burman et al., 1993; Cordova et al., 1993; Jacobson et al., 2000). The current study took a novel statistical approach to confirm these claims when taking into account the interdependence between partners and how their characteristics interact to predict IPV.

Contrary to expectations, the existing four-factor structure for SPAFF (Waldinger et al., 2004) was not replicated. Instead, the current study found support for separate factor structures for men and women, specifically a six-factor structure for men and a four-factor structure for women. The inability to replicate the factor structure identified by Waldinger and colleagues (2004) may have been due to sample differences and slight differences in SPAFF measurement.

Compared to the previous study (Waldinger et al., 2004), the current study had a larger and more diverse sample that was sampled for distress and violence. Two hundred fifty-eight couples participated in the current study, compared to forty-seven couples in the previous study. It's possible that having a larger sample may have impacted the applicability of the factor analysis procedure, as higher sample sizes are typically recommended (Comrey & Lee, 1992). Waldinger and colleagues (2004) had a racially homogenous sample (94% Caucasian), compared to the present study with a population of majority African-American/Black (43.6%), White (29.84%), and Hispanic (16.09%) participants. Since communication styles are known to vary across culture (Huang & Bedford, 2009; Williamson, Ju, Bradbury, Karney, Fang, & Liu, 2012), it's possible that sample demographic differences may have contributed to the inability to confirm the four-factor structure. Additionally, the current study sampled for distressed and violent couples. Since

there is abundant support for communication differences between violent and non-violent individuals and couples (Babcock, Waltz, Jacobson, & Gottman, 1993; Berns, Jacobson, & Gottman, 1999; Holtzworth-Munroe, Smutzler, & Stuart, 1998), it would not be surprising if this sampling difference also contributed to the inability to confirm the existing factor structure.

Regarding measurement of SPAFF, previous factor analytic studies used the intensity of SPAFF codes as the variables of interest. In contrast, the present study saw the practical advantages of discovering higher-order factors based on the duration of time spent engaging in the target behaviors, which also likely contributed to the inability to replicate factor analytic findings.

The current study found support for a six-factor SPAFF structure for men and a four-factor SPAFF structure for women. The current study factor structures offer a fair compromise between the extremes of examining each of the sixteen SPAFF codes individually at the expense of power, and the arbitrary distinction between "positive" and "negative" codes that loses the nuances of differences between codes. For men, the "positive" codes were split between two factors, labeled Passion and Friendship. While Waldinger and colleagues (2004) also had two "positive" factors (Empathy and Affection), the specific SPAFF codes loaded differently in the current study's factor analysis. For women, only one factor possessed "positive" codes (labeled Respect). This factor approaches resemblance to the Empathy factor (Waldinger et al., 2004) due to loadings of Validation and Interest. However, the code of Neutral also loaded on the Empathy factor in Waldinger et al.'s (2004) analysis, but it did not load on the Respect factor for the present study. The codes comprising the Aggression factor for men and women in the present study

(Defensiveness, Contempt, and Belligerence) are also encompassed within the Waldinger et al. (2004) Hostility factor. However, the Hostility factor also included other variables that did not load on the Aggression factor in the current study (i.e. Anger and Domineering). Although there was not consistency in factor loading between the two studies, both studies highlight the determination that all "positive" and "negative" codes are not created equal and are better studied when divided into meaningful sub-groups.

Clinical Implications

There are exciting implications for couples and IPV interventions. Evidence that IPV often occurs bilaterally (Langhinrichsen-Rohling et al., 2012) combined with the current study results, support the notion that couples interventions for IPV with community couples may be a viable alternative to the men's-group interventions that are currently in widespread use (Antunes-Alves & de Stefano, 2014; Cantos & O'Leary, 2014; Stith & McCollum, 2009). Offering conjoint treatment for IPV is controversial in the field (Armenti & Babcock, 2016), as proponents of more traditional theories of IPV have argued that to hold treatment with both partners would promote anti-feminist "victim blaming" (Dutton, 2012; Pence & Paymar, 1986; Straus, 1999). While this is a genuine concern, the current study did not find a difference between men and women with regard to frequency of IPV perpetration and found the interaction of male and female Aggression to be predictive of unilateral and bilateral IPV. Furthermore, evidence suggests that conjoint IPV treatment can be conducted safely for situationally-violent couples (Antunes-Alves & de Stefano, 2014; Bradley, Drummey, Gottman, & Gottman, 2014; Cantos & O'Leary, 2014; McCollum & Stith, 2008). Therefore, couples therapy targeting both partners' aggressive communication during conflict could be an effective addition to IPV treatment.

Babcock et al. (2011) found a brief communication intervention for violent men to significantly reduce Belligerence, Contempt, and other hostile affective behaviors expressed by men and women. Even though only men received the communication intervention, men and women experienced a reduction in negative affect known to be associated with IPV. Combined with the current study results, these findings also support the dyadic benefits of communication interventions at the individual or couple-level.

Some existing treatments for IPV may benefit from targeting specific Aggressive communication behaviors. The Creating Healthy Relationships Program (CHRP; Bradley et al., 2014) broadly targets communication behaviors as a treatment for relationship violence, and Domestic Violence-Focused Couples Therapy (DVFCT; Stith, McCollum, & Rosen, 2011) also teaches communication skills. The significant interaction of Aggression being associated with bilateral IPV perpetration found in the current study offer additional support for the inclusion of both partners in future intervention efforts that address dysfunctional communication. Overall, CHRP and DVFCT already offer promise for targeting maladaptive communication behaviors with bilateral, situationally-violent couples, and they may find their programs to be additionally more effective by specifically targeting aggressive communication behaviors found to be associated with unilateral and bilateral violence in the current study.

Limitations

Although the results from the current large, ethnically diverse sample offer promising implications for future research and violence treatment, there are some noteworthy limitations. First, couples were sampled for male-to-female violence or for those experiencing significant relationship distress. It is unclear how these results would

generalize to other groups, including shelter samples or court-ordered offenders. Additionally, it is unclear how these results would generalize to same-sex or couples who do not live together as if married, as living together and identifying as heterosexual were inclusion criteria for the current study.

Second, the data used for the present analyses were collected as part of three larger studies on emotion regulation in distressed and violent couples. Data were originally collected for a different set of research questions. As mentioned previously, participants were sampled for male-to-female violence. It would have been ideal to have sampled for both male-to-female violence and female-to-male violence. For this reason, it's possible that the current study sampling procedures inadvertently excluded couples with unilateral female IPV perpetration. There were also slight procedural differences (conflict discussion task length) between the studies where data were collected that were uncontrollable for the current study. Although this concern was addressed statistically for the present analyses by using the percentage of time participants engaged in SPAFF behaviors, there is a possibility that the procedural differences could have impacted results. Thus, results from the current study should be interpreted with caution until they can be replicated with a unitary procedure.

Third, there are noted limitations to using factor analysis with observational coding due to the mutually exclusive nature of the coding scheme (Gottman, 1979). Although results should be interpreted with caution, factor analysis of the intensity of SPAFF codes has been used in the past for the purpose of developing meaningful categories of behaviors (Heyman, Eddy, Weiss, & Vivian, 1995; Johnson, 2002; Waldinger et al., 2004). For the current study, the practical utility and resulting benefits of identifying higher-order factors for SPAFF behaviors is thought to outweigh the limitations.

Fourth, the cross-sectional design prevents the current study from making causal claims about the associations between SPAFF behaviors and IPV. However, the results from the current study offer support for future longitudinal studies to explore causative effects between communication changes and the subsequent impact on IPV perpetration.

Future Directions

There are several promising directions for researchers to expand upon the results from the current study. First, researchers may use empirically-supported factors to study communication behaviors in couples, while striking a balance between protecting power and studying nuances of communication behavior. Given the different factor structure identified for women and men in the current study compared to previous findings (Waldinger et al., 2004), CFA studies are warranted to confirm the current factor structure. It would also be interesting to directly compare factor structures for violent and non-violent individuals, given the existing findings for communication differences between violent and non-violent couples (Babcock, Waltz, Jacobson, & Gottman, 1993; Berns, Jacobson, & Gottman, 1999; Holtzworth-Munroe, Smutzler, & Stuart, 1998).

The current study's data analytic approach may be a beneficial framework to test other dyadic questions. This is one of the only dyadic studies that has directly compared gender effects of communication and IPV (Langhinrichsen-Rohling et al., 2012), although there is significant controversy about gender symmetry in IPV perpetration (Gondolf, 2014; Straus, 2014). Future studies are encouraged to implement gender comparisons to test differential predictors of IPV between male and female perpetrators. Since it was unable to be directly tested in the current study due to the absence of shared "positive" communication behavior factors between men and women, future studies may consider the examination of

the relation between positive affect and IPV using dyadic statistical approaches. It would also be interesting to examine how the relation between Aggression and IPV found in the current study holds when examining other forms of IPV (e.g. sexual assault). Other variables known to be associated with IPV could also be examined within the dyadic framework, such as alcohol use (Chermack, Fuller, & Blow, 2000; Rodriguez, DiBello, & Neighbors, 2015) or personality disorders (Costa & Babcock, 2008; Ross & Babcock, 2009).

Ultimately, the findings from the current study are expected to inform IPV intervention research. The cross-sectional nature of the current study makes it impossible to make causal claims about the relation between verbal aggression and IPV. Longitudinal studies are more appropriate to make causal claims. Specifically, longitudinal studies to identify whether interventions targeting the Aggression factor associated with unilateral and bilateral violence actually lead to a reduction in violence will provide support for more effective IPV treatments, especially couples interventions for situationally-violent couples.

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Table 1. Description of Specific Affect (SPAFF) Variables

Code	*Description*
Contempt	A sign of deep disrespect, including belittling, hurting, or humiliating the receiver. Indicators include sarcasm, mockery, insults, and hostile humor. Physical cues include eye rolling and the dimpler (mouth upturned to one side).
Belligerence	Provokes anger and serves to "get a rise" out of the receiver. Indicators include taunting questions, unreciprocated humor, and interpersonal terrorism ("What would you do if I did?" or "What are you going to do about it?"). Physical cues include a forward jaw thrust.
Defensiveness	Functions to deflect responsibility or blame. Indicators include the "yes-but," cross-complaining, minimization of the problem, excuses, and aggressive defenses ("I did not!"). Physical cues include folded arms and increased pitch and amplitude of voice.
Domineering	Exertion of control over one's partner or conversation. Indicators include invalidation, lecturing and patronizing, low-balling (e.g. "you want me to be happy, right?"), incessant speech, and glowering. Physical cues can include head forward, body forward, and finger pointing.
Disgust	A reaction to a stimulus that is noxious, including for moral or symbolic reasons. Indicators include involuntary revulsion and moral objection. Physical cues include wrinkled nose, upturned lip, and lowered brow.
Anger	An expression of displeasure and complaint, indicating that a boundary has been transgressed. Common indicators are frustration, angry "I-statements"

	(e.g. “I am so angry right now”), and commands (e.g. “stop”, or “Don’t speak to me like I’m a child!”). Physical cues include lips pressed together, tightened muscles in the neck and jaw, and an increased pitch, amplitude, and tempo of voice.
Fear/Tension	Communicates fear, worry, anxiety, nervous anticipation, or dread. Indicators include speech disturbances, fidgeting, nervous laughter, and nervous gestures. Physical cues include frequent eye movements, gulping, biting of lips, and the “unfelt smile.”
Stonewalling	An unwillingness to listen or respond to the receiver. Indicators include active away behavior (e.g. cleaning fingernails), no back channels (i.e. no head nods or verbal acknowledgements), and monitoring gaze (brief glances at partner). Physical cues include stiff face, clenched jaw, flexed neck muscles, or neutral facial affect.
Sadness	Communicates loss, resignation, helplessness, pessimism, and hopelessness. Indicators include sighing, pouting, resignation, crying, and hurt feelings. Physical cues include drooped shoulders, hanging head, trembling lip, and quavering voice.
Whining	A pleading form of emotional protest, suggesting an innocent victim stance. Indicators include whiny protest (“sing-songy” vocal pitch). Physical cues include raised brows and depressed mouth corners.
Neutral	“Dividing line” between positive and negative codes and an exchange of affectively unvalenced information. Physical cues include a relaxed voice quality.

Validation	Sincere understanding and acceptance of the partner's views. Indicators include back channels (i.e. head nods, "uh huhs") accompanied by eye contact, direct expression of understanding, and paraphrasing. Physical cues include raised brows.
Interest	Active elaboration or clarification seeking to express genuine interest in the other. Indicators include nonverbal attention with positive affect, elaboration and clarification seeking, and open-ended questions. Physical cues include cheeks raised, eyelids compressed, and lip corners raised in smile.
Humor	Shared mutual amusement to recognize a moment of absurdity or fun. The humor code requires shared amusement between partners. Indicators include good-natured teasing, wit and silliness, private jokes, and fun and exaggeration. Physical cues include cheeks raised, eyelids compressed, and lip corners raised in smile.
Affection	Expression of genuine caring and concern, and offering of comfort. Indicators include reminiscing, caring statements (e.g. "I love you"), compliments, empathy, and flirting. Physical cues often include a smile.
Joy	Passionate interest and enthusiasm in a person or activity. Indicators include anticipation, positive surprise, excitement, and expansiveness. Physical cues include leaning in and inner brow raise.

Note. Descriptions were derived from Coan and Gottman (2007).

Table 2. Waldinger and Colleagues' (2004) Principal Axis Factor Analysis of Emotion Expression Variables

	Factor			
Variable	*Hostility*	*Empathy*	*Affection*	*Distress*
Critical	**.96**	-	-.11	-
Contempt	**.82**	-.31	-	-
Anger	**.77**	-.19	-.21	.25
Belligerence	**.77**	-.36	-.11	.22
Domineering	**.77**	-	-	-.36
Defensiveness	**.68**	-.17	-	.25
Neutral	-.22	**.90**	.13	-.14
Interest	-.30	**.86**	-	-.27
Validation	-.34	**.86**	.12	-.18
Joy	-	.72	**.59**	-
Humor	-.20	-	**.84**	-
Affection	-.11	.43	**.75**	-
Fear/Tension	-	-.28	.26	**.66**
Sadness	.20	-	-.25	**.64**
Stonewalling	-.13	-.28	-.12	**.63**

Note. $N = 94$ participants. The extraction method used was principal axis factoring of Specific Affect (SPAFF) variables. The rotation method used was varimax with Kaiser normalization. Boldface values represent factor loadings used to make up the factors in each column. Dashes represent factor loadings < .10.

Table 3. Test of Sex Differences for Study Variables

Study Variable and Group	Score		Analysis of Variance	
	Mean	*SD*	*F*	*p*
Physical Assault			2.968	.086
Men	11.102	17.431		
Women	14.167	22.641		
Belligerence			6.052	.014
Men	.263	.341		
Women	.340	.364		
Contempt			21.125	<.001
Men	.348	.369		
Women	.508	.420		
Defensiveness			2.476	.116
Men	1.018	.464		
Women	.952	.491		
Anger			9.110	.003
Men	.049	.139		
Women	.097	.215		
Domineering			4.800	.029
Men	.541	.581		
Women	.651	.553		
Whining			7.360	.007

	Men	.020	.096		
	Women	.052	.176		
Sadness				10.880	.001
	Men	.012	.081		
	Women	.055	.193		
Fear/Tension				2.132	.145
	Men	.245	.307		
	Women	.285	.323		
Stonewalling				.702	.403
	Men	.171	.357		
	Women	.147	.307		
Disgust				2.749	.098
	Men	.003	.025		
	Women	.008	.044		
Neutral				.516	.473
	Men	61.868	20.314		
	Women	60.572	20.637		
Affection				.431	.512
	Men	.082	.189		
	Women	.072	.157		
Validation				2.113	.147
	Men	.350	.349		
	Women	.306	.340		

Interest				.142	.706
	Men	.185	.277		
	Women	.195	.288		
Humor				.244	.622
	Men	.322	.368		
	Women	.339	.367		
Joy				.946	.331
	Men	.001	.015		
	Women	.002	.017		

Table 4. Specific Affect Variable Correlations

Variable	*Ang*	*Bel*	*Dom*	*Con*	*Whi*	*Sad*	*Sto*	*Def*	*Fea*	*Dis*	*Aff*	*Val*	*Int*	*Hum*	*Joy*	*Neu*
Ang		.18**	.12*	.14*	.10	.12	.25***	-.02	-.06	.12*	-.02	-.14*	-.07	-.11	-.03	-.09
Bel	.27***		.10	.34***	.00	.03	.03	.25***	.08	-.02	-.12*	-.24***	.02	-.06	-.07	-.26***
Dom	.20**	.06		.11	-.01	-.03	.00	-.05	-.24***	-.03	.01	-.13*	-.20**	-.07	-.04	-.50***
Con	.17**	.37***	.22***		.14*	-.03	.22***	.25***	-.06	-.05	-.03	-.34***	-.09	-.14*	.06	-.37***
Whi	-.03	.19**	-.02	-.01		.33***	.01	.03	-.05	-.02	.06	-.12	-.03	.00	.19**	-.04
Sad	.23***	.06	.16*	-.05	.05		-.05	.00	-.06	-.02	.00	-.03	-.02	-.02	-.01	.05
Sto	.20**	.17**	.01	.07	-.01	.14*		.02	-.06	.16**	-.10	-.08	-.07	-.17**	.02	-.16**
Def	-.01	.22***	.01	.33***	.08	-.11	.01		.16**	-.02	-.16*	-.16*	.00	-.15*	-.19**	-.43***
Fea	-.09	.04	-.09	.04	-.01	-.07	.00	.17**		.03	-.04	.01	.03	.20**	-.07	.00
Dis	.22***	.01	.13*	.07	-.04	.05	.01	.04	-.01		-.04	-.02	.03	-.03	-.01	.05
Aff	.07	-.05	.05	-.08	.11	-.03	-.07	-.09	.06	.00		.17**	.20**	.00	.46	-.14*
Val	-.20**	-.31***	-.16*	-.40***	.03	-.06	-.09	-.24***	-.05	.01	.15*		.30***	.30***	.02	.12
Int	-.14*	-.11	-.28***	-.31***	.03	-.08	-.09	-.07	.01	-.09	.04	.35***		.06	.27***	-.06
Hum	.01	-.11	-.04	-.12	-.01	-.13*	-.12	-.15*	.13*	.05	.26***	.26***	.10		-.03	.08
Joy	.12	.03	-.03	.02*	-.03	-.03	.08	.00	-.01	-.02	.06	.08	.05	.04		-.09
Neu	-.16**	-.38***	-.48***	-.41***	-.13*	-.11	-.17**	-.52***	-.04	-.12	-.05	.20**	.12*	.11	.02	

Note. Correlations for men are listed above the diagonal, and correlations for women are listed below the diagonal. *Ang* = Anger, *Bel* = Belligerence, *Dom* = Domineering, *Con* =

Contempt, *Whi* = Whining, *Sad* = Sadness, *Sto* = Stonewalling, *Def* = Defensiveness, *Fea* = Fear/Tension, *Dis* = Disgust, *Aff* = Affection, *Val* = Validation, *Int* = Interest, *Hum* = Humor, *Joy* = Joy, *Neu* = Neutral. * $p<.05$, ** $p<.01$, *** $p<.001$.

Table 5. Factor Correlation Matrix for Men

Factor	*1*	*2*	*3*	*4*	*5*	*6*
1		.048	-.169	-.003	.113	-.287
2			.045	-.021	-.019	-.216
3				-.027	-.089	.155
4					.075	.161
5						-.195
6						

Note. The extraction method was Maximum Likelihood, with an Oblimin rotation.

Table 6. Factor Correlation Matrix for Women

Factor	*1*	*2*	*3*	*4*
1		.058	-.299	.203
2			-.034	.251
3				-.157
4				

Note. The extraction method was Maximum Likelihood, with an Oblimin rotation.

Table 7. Maximum Likelihood Factor Analysis Loadings for Men

	Factor					
Variable	*Aggression*	*Passion*	*Friendship*	*Passivity*	*Stonewalling*	*Despair*
Belligerence	**.32**	-	-	-	-	-
Defensiveness	**.63**	-	-	-	-	-
Contempt	**.36**	-	**-.44**	-	-	-
Affection	-	**.58**	-	-	-	-
Interest	-	**.36**	-	-	-	-
Joy	-	**.82**	-	-	-	-
Validation	-	-	**.75**	-	-	-
Humor	-	-	**.34**	-	-	-
Domineering	-	-	-	**-.89**	-	-
Neutral	**-.88**	-	-	**.34**	-	-
Fear/Tension	-	-	-	**.30**	-	-
Stonewalling	-	-	-	-	**.99**	-
Whining	-	-	-	-	-	**.45**
Sadness	-	-	-	-	-	**.79**

Note. Extraction method was Maximum Likelihood, and the Varimax rotation converged in 7 iterations. Loadings with an absolute value less than .3 were not included. Anger was not included due to the variable having loadings with an absolute value less than .3. Disgust variable was dropped from the factor analysis due to low initial communality when included (.05). Boldface values represent factor loadings used to make up the factors in each column.

Table 8. Maximum Likelihood Factor Analysis Loadings for Women

	Factor			
Variable	*Aggression*	*Respect*	*Domineering*	*Emotional Lability*
Belligerence	**.34**	-	-	**.37**
Defensiveness	**.64**	-	-	-
Contempt	**.38**	**-.49**	-	-
Validation	-	**.68**	-	-
Interest	-	**.44**	-	-
Domineering	-	-	**.98**	-
Anger	-	-	-	**.53**
Sadness	-	-	-	**.40**
Stonewalling	-	-	-	**.38**
Neutral	**-.90**	-	**-.35**	-

Note. Extraction method was Maximum Likelihood, and the Varimax rotation converged in 5 iterations. Loadings with an absolute value less than .3 were not included. Whining, Joy, Fear/Tension, and Disgust variables were dropped from the factor analysis due to low initial communalities when included (.08, .05, .08, and .08, respectively). Humor and Joy were not included in the table, although they were included in the analysis, due to absolute value factor loadings less than .3. Boldface values represent factor loadings used to make up the factors in each column.

Table 9. Correlations Among Aggression Factor Scores and Physical Assault Perpetration

Variables	*Aggression Factor*	*Physical Assault*
Aggression Factor	.755***	.220***
Physical Assault	.247***	.777***

Note. Correlations for men appear above the diagonal; correlations for women appear below the diagonal. Correlations along the diagonal are absolute agreement intraclass correlations (ICCs) between men and women. ***p<.001.

Table 10. Results from Main Effects APIM

	Male IPV		Female IPV	
Predictors	*b*	*SE*	*b*	*SE*
Male Aggression	3.78***	.97	2.17*	.94
Female Aggression	2.17*	.94	3.78***	.97

Note. Parameter estimates are unstandardized. They were constrained to be the same for men and women due to results from the test of distinguishability. *p<.05; ***p<.001

Table 11. Results from Interaction APIM

	Male IPV		Female IPV		Bilateral IPV	
Predictors	*b*	*SE*	*b*	*SE*	*b*	*SE*
Male Aggression	3.15*	1.59	2.69	2.08	10.69	11.48
Female Aggression	3.27*	1.50	5.39**	1.96	27.97**	10.82
MxF Aggression	4.18**	1.33	3.87*	1.74	29.77**	9.61

Note. Parameter estimates are unstandardized. MxF = Interaction of Male and Female Aggression factor scores. *p<.05; **p≤.01.

Table 12. Conditional Effects of Male Aggression on Male Physical Assault

Female Aggression	*b*	*p*
One *SD* below the mean	-.484	.80
At the mean	3.153	.05
One *SD* above the mean	6.79	.001

Table 13. Conditional Effects of Female Aggression on Female Physical Assault

Male Aggression	*b*	*p*
One *SD* below the mean	2.208	.35
At the mean	5.386	.007
One *SD* above the mean	8.563	<.001

Table 14. Conditional Effects of Male Aggression on Bilateral Physical Assault

Female Aggression	*b*	*p*
One *SD* below the mean	-15.208	.271
At the mean	10.693	.356
One *SD* above the mean	36.593	.014

Figure 1. APIM Main Effects Model

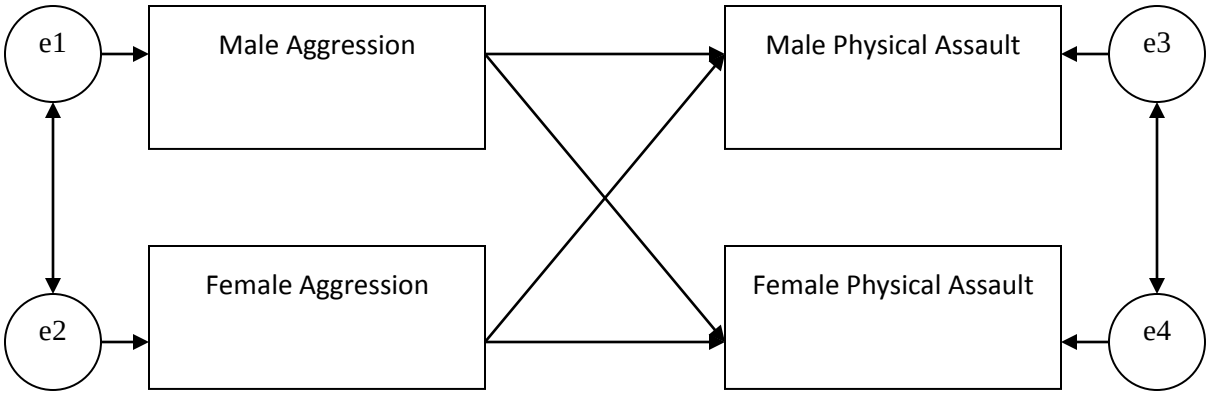


Figure 2. Results of APIM Main Effects Model

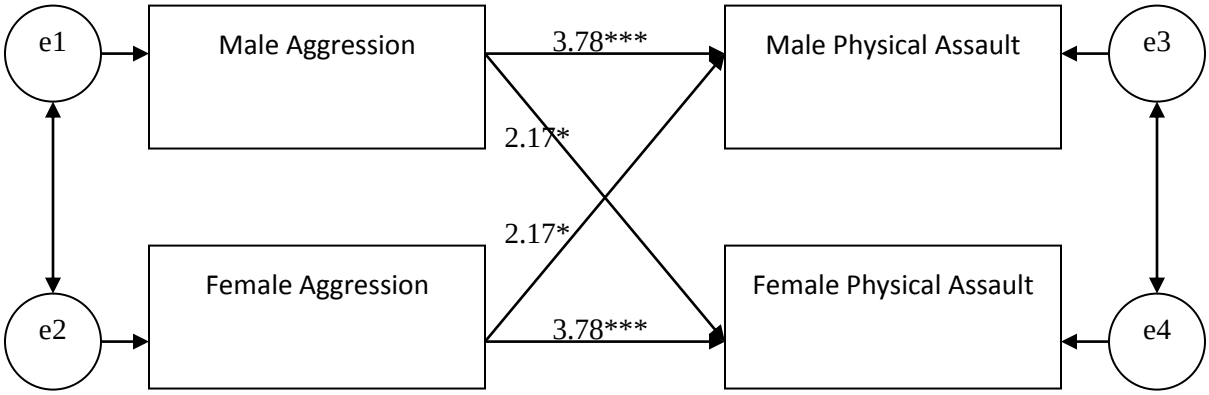


Figure 3. APIM Interaction Model

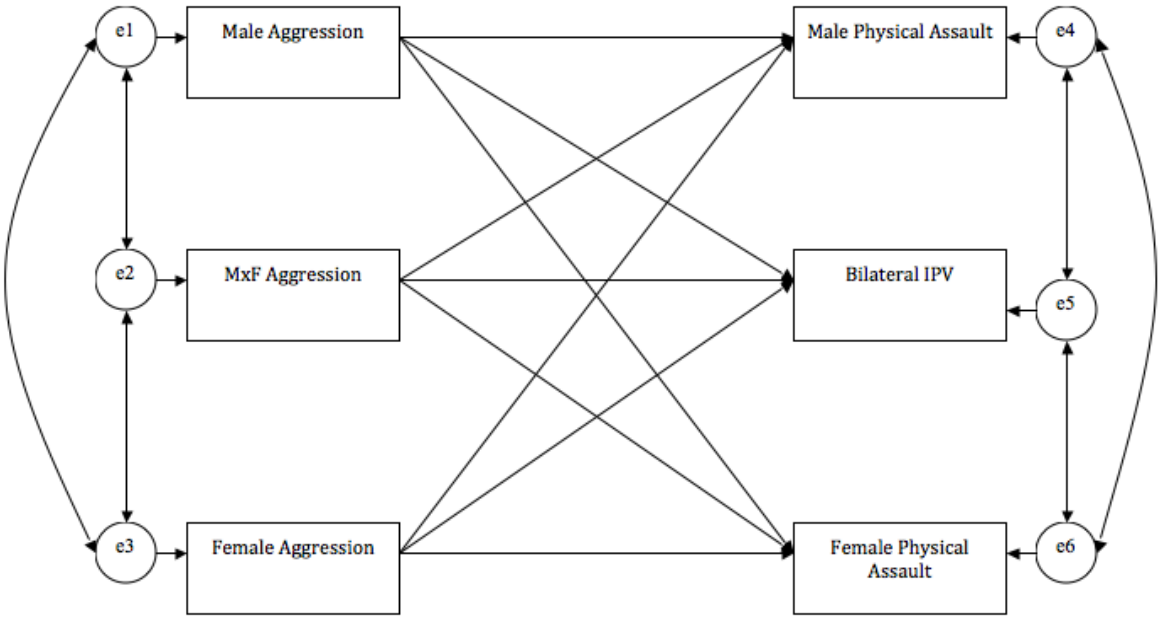


Figure 4. Results of APIM Interaction Model

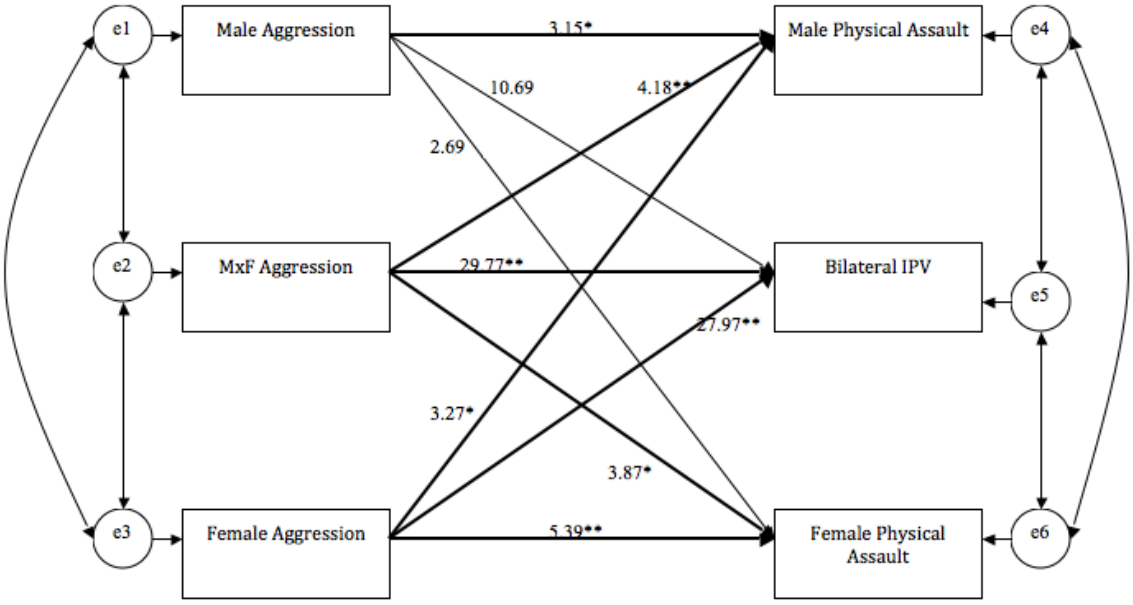


Figure 5. Male Aggression and Female Aggression Interact to Predict Male Physical Assault (*N* = 258)

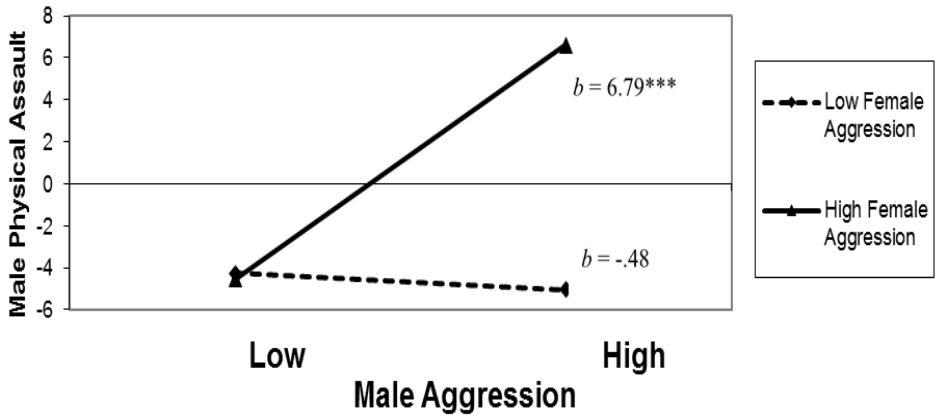
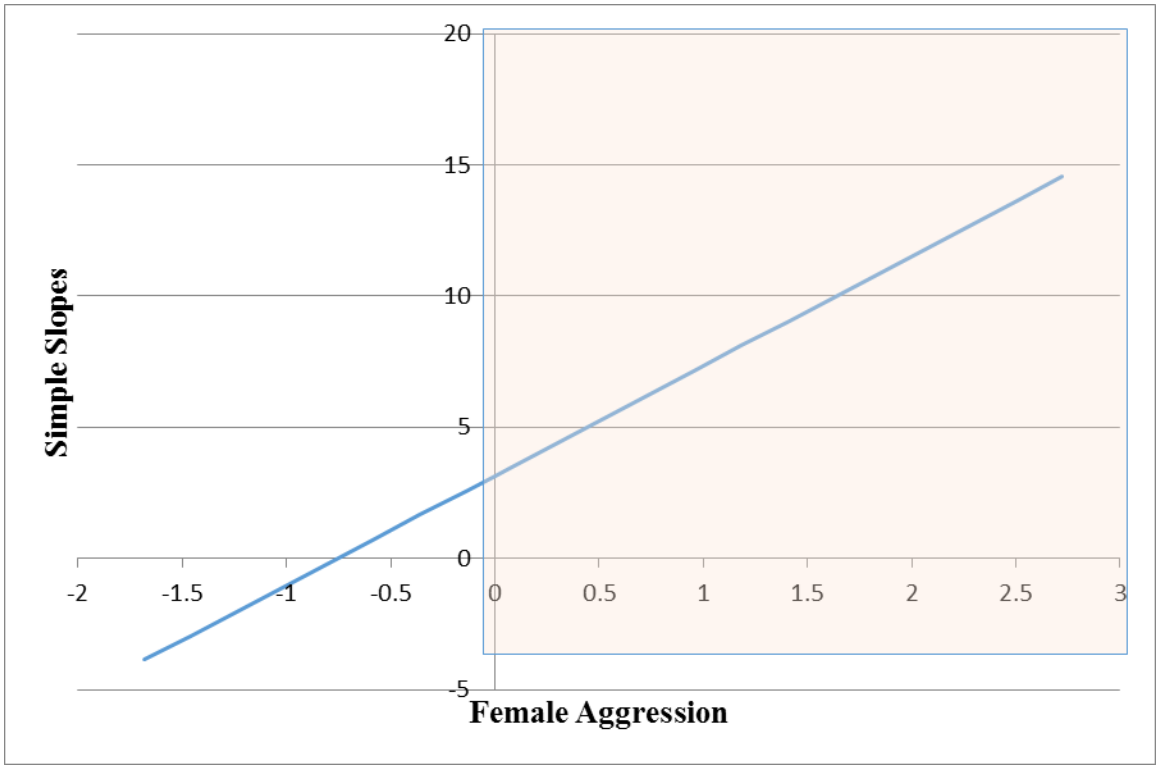


Figure 6. Region of Significance of the Conditional Effect of Female Aggression on the Relation Between Male Aggression and Male Physical Assault



Note. Region of significance x > -.0011

Figure 7. Male Aggression and Female Aggression Interact to Predict Female Physical Assault (*N* = 258)

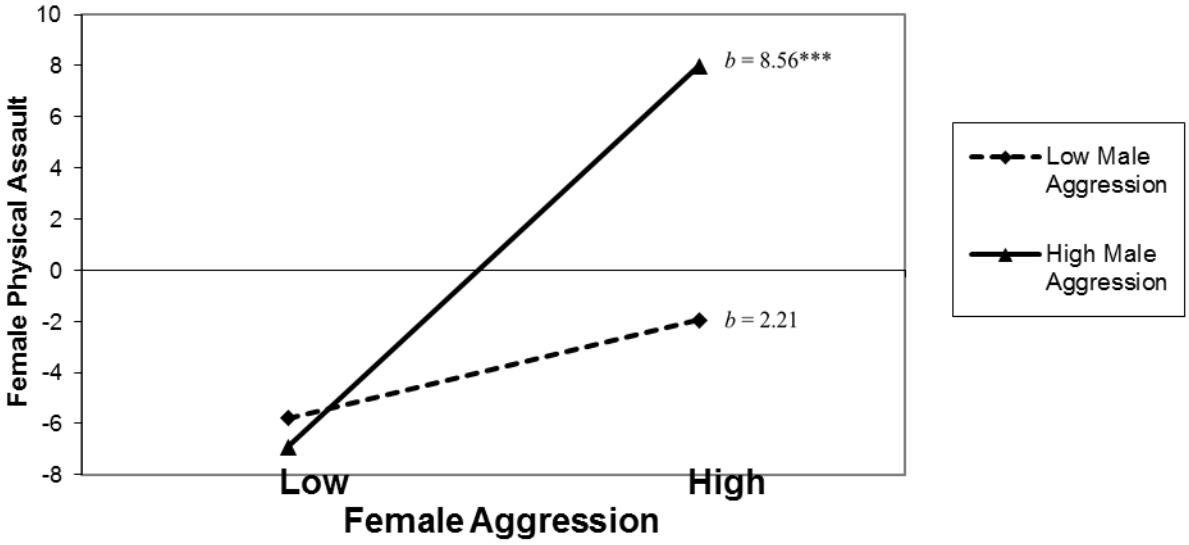
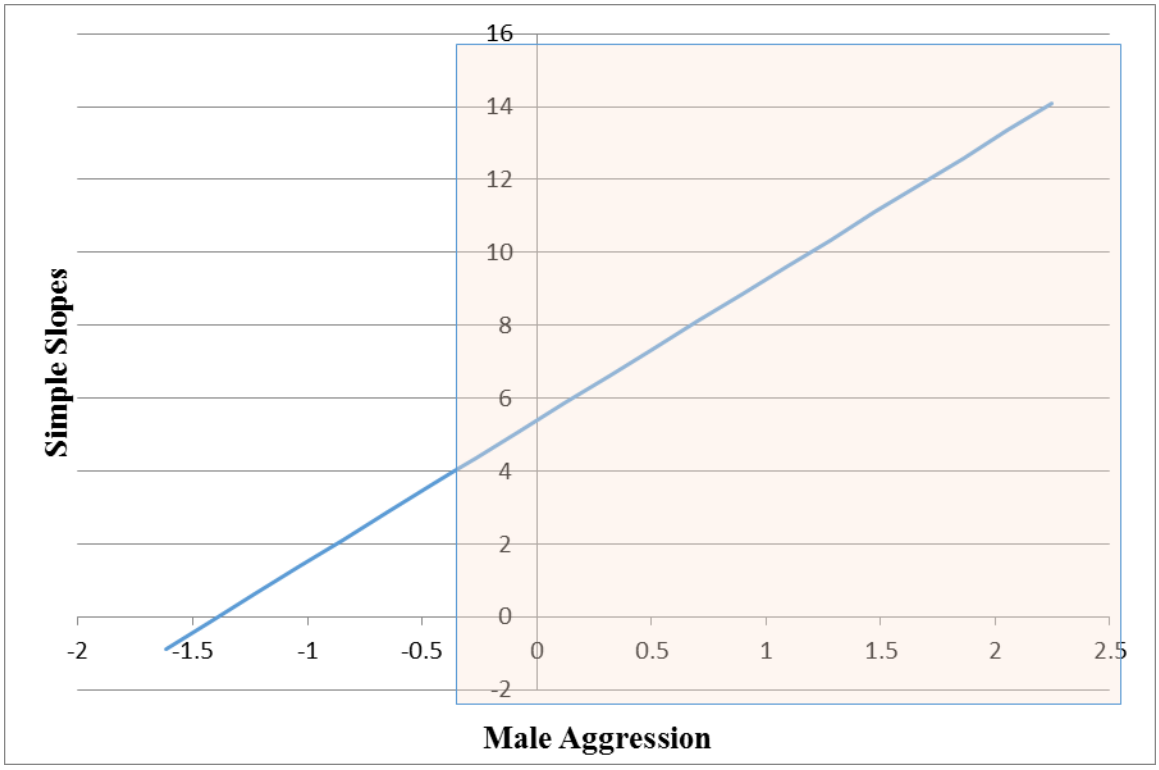


Figure 8. Region of Significance of the Conditional Effect of Male Aggression on the Relation Between Female Aggression and Female Physical Assault



Note. Region of significance x > -.3594

Figure 9. Male Aggression and Female Aggression Interact to Predict Bilateral Physical Assault (*N* = 258)

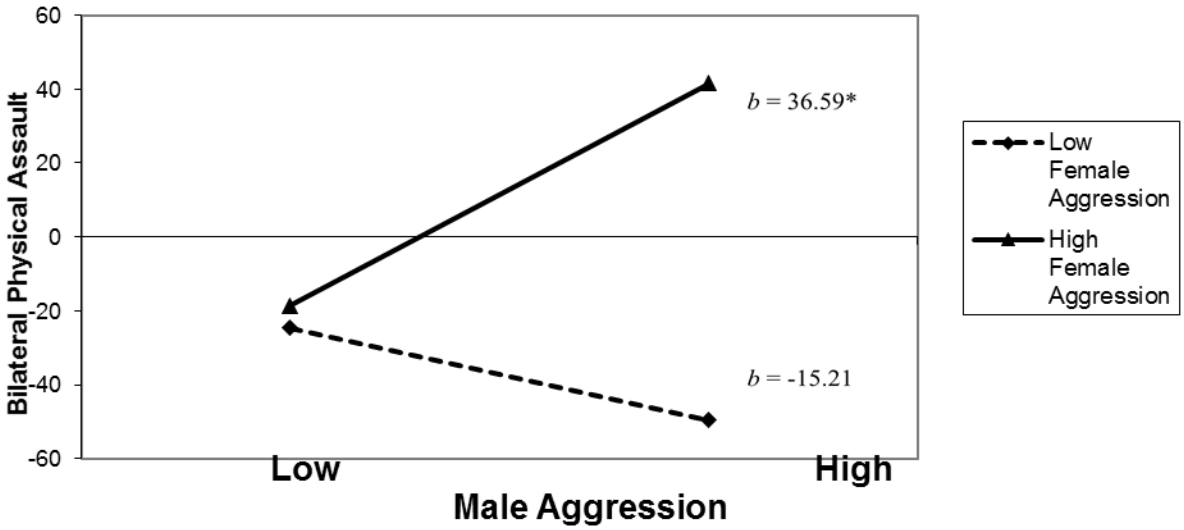
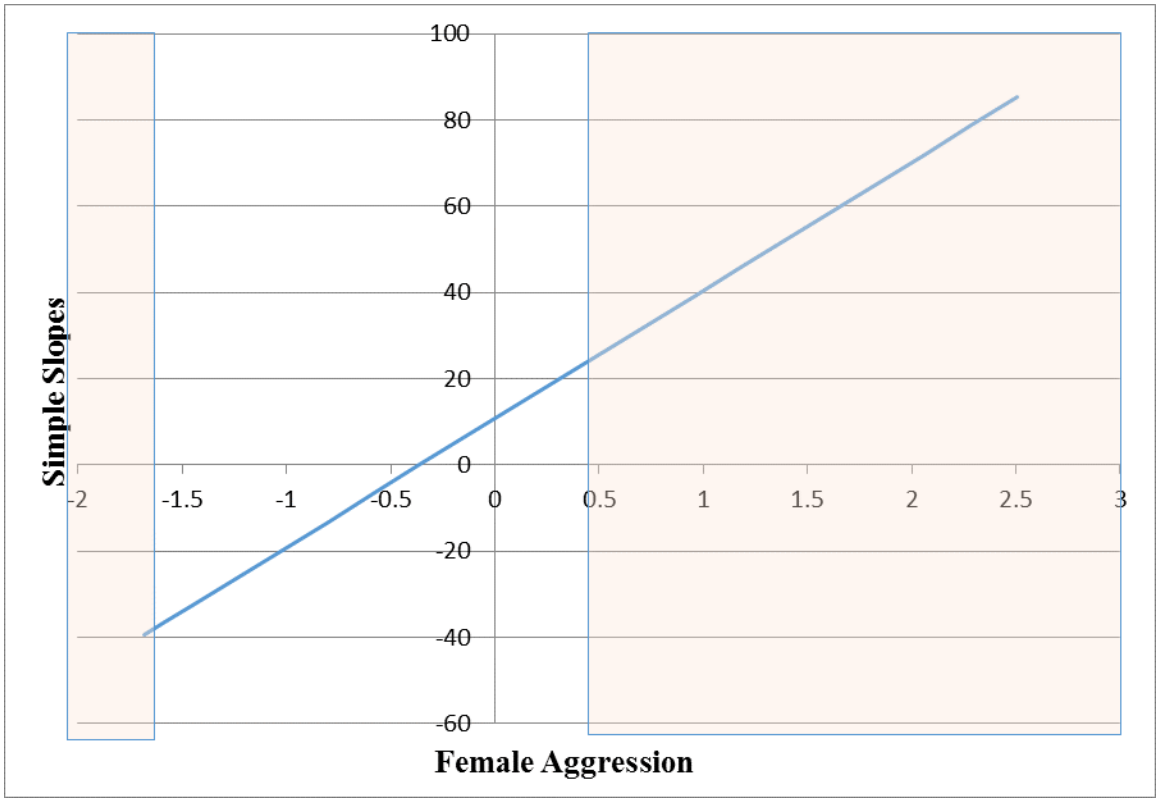


Figure 10. Region of Significance of the Conditional Effect of Female Aggression on the Relation Between Male Aggression and Bilateral Physical Assault



Note. Region of significance x < -1.5829; x > .4895