PATTERNS OF EMOTIONAL AROUSAL IN COUPLES WITH AND WITHOUT RELATIONSHIP DISTRESS AND HISTORIES OF INTIMATE PARTNER VIOLENCE

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ABSTRACT

Alexandra Kristina Wojda: Patterns of Emotional Arousal in Couples With and Without Relationship Distress and Histories of Intimate Partner Violence
(Under the direction of Donald H. Baucom)

Intimate partner violence (IPV) is an inherently dyadic phenomenon that often occurs during conflict escalation between partners. Yet, among the risk factors that have been consistently associated with male-to-female IPV, the interpersonal context is one of the least well understood. Thus, identifying which aspects of interpersonal communication are associated with IPV is critical to inform emerging models of relational violence. Although heightened emotional arousal is a common experience of individuals who engage in IPV, and emotional interdependence in couples is related to individual and relational well-being, no investigation to date has explored detailed patterns of emotional arousal as these unfold during conversations involving couples with histories of male-to-female IPV. Accordingly, the current study examines patterns of vocally-encoded emotional arousal during couple conversations between men who previously engaged in IPV and their female partners, as well as couples without IPV (N = 149). Couples were recruited using a 2x2 design that crossed relationship distress and mild physical IPV; all couples completed two problem-solving discussions. Emotional arousal was measured continuously during each conversation using vocal fundamental frequency. Contrary to expectations, emotional arousal changed in unique ways based on the presence of IPV and relationship distress. During the conversations, men within the distressed/IPV group demonstrated continuous linear increases in arousal, compared to distressed/IPV women, who

demonstrated overall patterns of de-escalation by the end of the conversation. Men and women in all other groups mirrored each other's trajectories, either remaining emotionally consistent across the conversation (non-distressed/no-IPV group), or escalating and then de-escalating to an extent (distressed/no-IPV and non-distressed/IPV groups). These different patterns of negative emotional arousal suggest that the relationship context alone may not be enough to explain violent behavior. This study thus offers insight into the dynamic interpersonal processes that might enhance IPV risk and encourages a more nuanced, interpersonal research agenda within the field of IPV studies.

TABLE OF CONTENTS

LIST OF TABLES

Table

CHAPTER 1: INTRODUCTION

Intimate partner violence (IPV) occurs in one-fourth to one-half of couples in dating, co-habiting, engaged, and marital relationships (Lawrence & Bradbury, 2001; Slep & O'Leary, 2005), with men and women reporting comparable rates of violence perpetration and victimization (Straus, 2011). The most frequently reported forms of verbal or physical aggression in romantic relationships are yelling, threatening, pushing, slapping, and grabbing, whereas severe forms of aggression (e.g., battery, assaults with weapons) are less common (O'Leary & Williams, 2006; Straus & Gelles, 1990). Although both men and women engage in and experience violent behavior, scores of empirical studies have primarily attempted to document and explain male-to-female IPV. Since Walker's (1979) seminal description of the adverse effects of IPV against women, research has consistently shown that male-to-female IPV results in more negative health consequences than female-to-male IPV (Archer, 2000), including physical injury, major depressive episodes, and post-traumatic stress disorder (Ellsberg et al., 2008; Lawrence, Orengo-Aguayo, Langer, & Brock, 2012), as well as a greater likelihood for chronic pain, substance use, and suicide (Black et al., 2011; Campbell et al., 2002; Coker et al., 2000).

Currently, a variety of interventions exist for treating relationship violence (Armenti & Babcock, 2016). Yet, despite the wide range of approaches that have been applied to curtail the social acceptance and overall prevalence of IPV (Tolan, Gorman-Smith, & Henry, 2006), it continues to be a pervasive public health concern with significant economic ramifications. According to the National Center for Injury Prevention and Control (2003), the estimated cost of

intimate partner physical assault, partner rape, and stalking exceeds more than 5.8 billion dollars annually in the U.S., the largest proportion of which is used to treat health-related impacts of physical violence. This highlights the need for continued serious attention to this problem.

Because partner violence has long been recognized as an antecedent of adverse health outcomes, comprehensive etiological models of IPV have been developed to identify reliable risk factors of IPV, inform risk assessment methods, and improve empirically-supported intervention programs for individuals who engage in relational violence. In part, this has led to several models of IPV etiology, including: (a) the gender-themed power-and-control theory (e.g., Pence & Paymar, 1993) in which IPV is viewed as the consequence of patriarchal socialization patterns, (b) intrapersonal models that emphasize different individual risk factors and IPV typologies (e.g., Holtzworth-Munroe & Stuart, 1994), (c) interpersonal models that emphasize the centrality of dyadic relationship dynamics in violent partner behavior (e.g., Capaldi & Kim, 2007; Kelly & Johnson, 2008; Langhinrichsen-Rohling, 2010), and (d) meta-theories of violent behavior (e.g., Instigation-Impellance-Inhibition [I^3] Theory, Finkel, 2007), which address the ways in which factors from each of the aforementioned models interact to promote IPV perpetration. Of these, the feminist power-and-control theory continues to wield the most influence on IPV research, policy, and intervention, despite evidence casting serious doubt on the effectiveness of gender-based treatment paradigms (Babcock, Green, & Robie, 2004; Dutton & Corvo, 2007). The other models, while possessing less influence over current treatment practices, emerged in response to the inability of traditional feminist views to account for (a) the heterogeneous nature of the partner violence within court-mandated versus community samples of couples and (b) the high prevalence of bidirectional violence in couples reporting IPV (Langhinrichsen-Rohling, Misra, Selwyn, & Rohling, 2012; Whitaker, Haileyesus, Swahn, &

Saltzman, 2007). Together, these perspectives have provided alternative explanations for why some partners are violent towards each other, pointing not only to the influence of personality traits and psychopathology (e.g., Holtzworth-Munroe & Meehan, 2000), but also to dimensions of the relational context in which IPV is embedded.

Research that has examined the interpersonal context of IPV has described several different subtypes of dyadic violence. The most well-known of these typology models has been delineated by Johnson and colleagues (Johnson, 1995; Kelly and Johnson, 2008), which, like other typologies (e.g., Chase, O'Leary, & Heyman, 2001), defines IPV in terms of its motivation as opposed to the characteristics of the perpetrator. According to Johnson's most recent writings (2008), IPV can be separated into three groups: (a) intimate terrorism (also known as "coercive controlling violence"), (b) violent resistance, and (c) situational couple violence. Intimate terrorism, he argues, is characterized by patterns of violence that are driven by a desire to maintain dominance and control over one's partner, is representative of court-mandated treatment samples, and is almost exclusively perpetrated by men. Violent resistance, on the other hand, is self-defensive in nature, describing behavior that often takes place in reaction to coercive violence and is intended to protect oneself from injury. Lastly, situational couple violence has been recognized as the most common type of violence among community couples, typically emerging out of poorly-handled conflict and escalating to minor physical violence between partners.

Unifying previously disparate gender-related findings about the directionality of IPV, these distinctions have propelled the field to consider the utility of identifying and describing dyadic processes associated with different patterns of violence. Specifically, the distinction between intimate terrorism and situational couple violence has received consistent empirical

validation (e.g., Graham-Kevan & Archer, 2003), discouraging practitioners and policy makers from using a "one size fits all" approach in the treatment of relationship violence. Moreover, Johnson's work has inspired greater consideration of the heterogeneity among couples who engage in mutually violent behavior, generating adjunctive theories that identify sub-groups of bi-directionally violent couples (e.g., dyadic domination, dyadic dysregulation, and reciprocal violence (Langhinrichsen-Rohling, 2010). Ultimately, by suggesting that IPV is typically the outcome of a dyadic process, Johnson's typologies challenge several commonly-held beliefs about IPV: (a) that men are the sole perpetrators of relational violence and women are always the victims, (b) that violence is an expression of power and control within a male-dominated society, and (c) that investigating relationship dynamics related to IPV supports "victim-blaming" (Langhinrichsen-Rohling, 2010).

Unfortunately, while typological theories of mutual violence hold promise in the prediction and treatment of IPV, little empirical work has been conducted to elucidate the dyadic factors leading to bi-directional violence. As Capaldi and Kim (2007) note, previous typological studies have prioritized identification of IPV sub-groups over investigating the risk factors associated with mechanisms of partner violence. In other words, typological research stops short of being descriptive in nature, focusing on a narrow range of factors linked to IPV risk (e.g., severity and frequency of violence, antisocial and borderline personality traits). As a result of the continued emphasis on men as perpetrators of violence against women and related sensitivity around the potential for "blaming the victim," research continues to rely on a priori assumptions of gender differences and emphasizes distal factors (e.g., intergenerational violence) to build theoretical models of male-to-female IPV (Finkel, 2007). That is, the bulk of research on

relational violence attempts to understand how an individual's experiences *outside* of a current relationship influence their behavior *within* the relationship.

However, in addition to the findings indicating that both men and women are violent in relationships, many studies have demonstrated that certain proximal processes, including relationship distress and conflict negotiation, are important in understanding the initiation and maintenance of violent partner behavior (e.g., Feldman & Ridley, 2000; Jacobson et al., 1994; Murphy & Eckhardt, 2005; Schumacher, Feldbau-Kohn, Slep, & Heyman, 2001; Stith et al., 2004). Thus, in keeping with Johnson's (2008) and Capaldi and Kim's (2007) perspectives on IPV, elucidating the factors related to bilateral violence requires the view that IPV is an inherently dyadic phenomenon occurring during the interaction of two individuals. It is important to recognize that understanding the relational context within which IPV occurs does not imply blaming the recipient of the violence, but rather is an attempt to understand the ecological context within such behaviors take place. As such, in an attempt to fill some of the aforementioned gaps in the IPV literature, the purpose of the present study is to examine emotion communication patterns within couple conflict and relational contexts (e.g., relationship distress versus satisfaction) associated with violent partner behavior in heterosexual couples.

Historically, high levels of relationship conflict and low levels of relationship satisfaction have been two of the most frequently studied predictors of IPV (Saunders, 1995). A large body of evidence demonstrates that couples who experience IPV tend to be dissatisfied with their relationship and engage in high levels of conflict with their partner (O'Leary, Malone, & Tyree, 1994; Stith, Green, Smith, & Ward, 2004; Stith, Smith, Penn, & Ward, 2008). Although it is difficult to determine whether low satisfaction leads to increased conflict and subsequent violence, or whether low satisfaction and high levels of conflict result from IPV (e.g., Lawrence

& Bradbury, 2007), verbal conflict appears to be a prime antecedent to episodes of relationship violence. This not only includes verbal aggression and the ways in which partners maintain and escalate problem discussion (O'Leary, 1993; Sabourin, Infante, & Rudd, 1993), but also violence perpetrated in reaction to a partner's jealousy or attempts to assert their autonomy in the relationship (Babcock, Costa, Green, & Eckhardt, 2004). As such, some of the variance in IPV can be explained by dynamic interactions within relationships—not simply by the individual, idiosyncratic experiences and characteristics of the partners involved.

To date, what we know about the interactions of IPV couples stems largely from observational research. Within this literature, a common theme emerges: IPV is an interactive process, often defined by frequent repeated exchanges of hostility, anger, contempt, and belligerence between partners. Seminal investigations on the communication styles of couples with and without experiences of IPV have demonstrated that IPV couples, compared to non-IPV partners, emit higher rates of belligerence and contempt during laboratory-based conflict discussions, with both husbands and wives engaging in high levels of hostility (e.g., Burman, Margolin, & John, 1993; Cordova et al., 1993; Jacobson et al., 1994). Specifically, Cordova et al. (1993) found higher levels of negative reciprocity—an interdependent exchange of negative behavior and affective expressions—in both spouses of violent couples compared to non-violent satisfied and non-violent distressed couples. Burman et al. (1993), on the other hand, examined home reenactments of typical conflict conversations between physically aggressive, verbally aggressive, withdrawing, and satisfied couples, and found that, relative to other participants, physically aggressive couples (a) reciprocated angry, contemptuous behavior more often and more persistently and (b) demonstrated poorer problem-solving ability. Similar patterns have been detailed in more recent explorations of communication in dating couples and couples

categorized according to Johnson's subtypes (situational violence versus intimate terrorism). For instance, Paradis, Hebert, and Fernet (2017) found that negative communication behavior of one partner (e.g., negative affect, withdrawal) can be predictive of the other partner's violence, but not of their own. Additionally, Friend, Cleary Bradley, and Gottman (2017) lend support to the differences among Johnson's sub-groups of violent couples, demonstrating that situationally violent couples were less defensive, belligerent, and contemptuous, and displayed less negative affect (e.g., anger), relative to couples who reported experiences of intimate terrorism. Most interestingly, however, this investigation also found that the communication behavior of distressed non-violent distressed couples was not markedly different from that of situationally violent couples, suggesting that conflict between distressed partners may have the potential to escalate to the use of low-level violence.

Self-report studies have also shown that hostile communication is endemic to couples who engage in physical violence. Lloyd (1990) found that violent couples, irrespective of reported levels of relationship distress, reported fewer "squabbles" (conversations that do not escalate and remained unresolved). Violent distressed couples, in particular, used less negotiation, and engaged in more verbal attack, withdrawal, and stable, heated arguments during conflict discussions. Violent non-distressed couples, on the other hand, reported a mixed picture of conflict strategies, relying on high levels of both destructive communication (e.g., verbal attack, anger) and constructive communication (e.g., problem solving, compromise). Separately, in an interview study of situationally violent couples, Stith et al. (2011) reported that relational violence seemed to be associated with an inability to resolve conflict. Couples who indicated a build-up of unresolved conflict in their relationship also noted an inability to diffuse arguments, claiming that they were stuck in an ongoing pattern of rapid conflict escalation and de-escalation

with their partner. Taken together, these findings suggest that the combination of relationship distress and violence is especially potent, leading to (a) high frequencies of verbal aggression, (b) frequent reciprocity of verbal aggression, (c) strong feelings of anger and contempt that are long-lasting during conflict-based interactions, and (d) unresolved conflict that "sets the stage" for future episodes of IPV (Feldman & Ridley, 2000).

Although cycles of negative reciprocity distinguish violent from non-violent couples, distinguishing the unique influence of violence from that of relationship distress during couple interactions presents some challenges. While the studies noted above (Cordova et al., 1993; Jacobson et al., 1994; Lloyd, 1990) found that violent couples expressed more hostility and anger than distressed/non-violent couples, few others have made such a distinction (e.g., Holtzworth-Munroe, Smutzler, & Stuart, 1998). Within the body of literature that has compared the communication styles of violent and non-violent couples, relationship distress appears to be addressed in one of two ways. On the one hand, it is considered a part of the natural context for IPV and thus is not directly measured in couples with experiences of IPV (e.g., Gordis, Margolin, & Vickerman, 2005). In this way, comparing violent to distressed/non-violent couples is a methodologically and empirically compromised decision, as some couples report high levels of relationship satisfaction despite their experiences of conflict and violence (Williams & Frieze, 2005). On the other hand, relationship distress is measured but controlled for during analyses (e.g., Berns, Jacobson, & Gottman, 1999), limiting the degree to which it can be understood as a moderator of differences in communication. Because the existing literature has often confounded violence with relationship distress and has rarely examined the question of whether violence has its own dynamics or is dependent on relationship distress (Lloyd, 1990), disentangling the effect

of violence from relationship distress during couple communication requires further investigation.

In fact, there is evidence to suggest that the conflict profiles of distressed couples are similar in nature to those of IPV couples. A review by Heyman (2001) notes that over 200 couple observational studies have investigated the distinct behavioral profiles of clinically distressed partners, determining that, relative to non-distressed partners, such couples (a) initiate their conversations with more hostility and are more likely to maintain it over the course of a conversation, (b) are more likely to reciprocate their partners' hostility, (c) are more likely to engage in demand/withdraw behavior, and (d) are less likely to suppress their anger during conflict, thereby resulting in prolonged negative reciprocity cycles. Furthermore, several scholars have long called for continued investigation of the unique role of relationship distress in couples who engage in IPV (e.g., Lloyd, 1990; Feldman & Ridley, 2000), as it is not always clear whether communication behavior of couples with IPV is attributable to the experience of relationship distress, violence, or both. Thus, topographical similarities in conflict behaviors among distressed/violent and distressed/non-violent couples reveal an inherent tension in IPV research: If couples experiencing relationship distress do not always interact in behaviorally distinct ways from distressed/violent couples, how do we begin to explain *why* certain interactions do or do not result in IPV?

Numerous investigations of risk factors for IPV have demonstrated that internal experiences, including negative affective states, play a significant role in IPV. This suggests that our understanding of violence risk might be enhanced by considering the experience and expression of negative emotions of individuals who engage in IPV. Men and women who have been violent towards their partner are significantly more likely to score within the clinical range

on measures of depression, anxiety, and negative emotionality (Moffitt, Krueger, Caspi, & Fagan, 2000; Swan, Gambone, Sullivan, & Snow, 2005) and are more likely to report feelings of jealousy and shame than non-violent individuals (Foran & O'Leary, 2008). More strikingly, several meta-analyses and literature reviews (e.g., Birkley & Eckhardt, 2015; Dutton, 2010; Eckhardt, Barbour, & Stuart, 1997; Norlander & Eckhardt, 2005) consistently support the notion that high levels of anger and internalizing negative emotions are linked to the perpetration of IPV. From a theoretical perspective, anger, in particular, has been thought to increase IPV risk in a number of ways. For instance, social information processing models contend that individuals at-risk for interpersonal violence may interpret contextual cues in ways that increase hostile cognitions, promote intense emotional experiences (i.e., anger), and endorse aggressive responding (Dodge & Pettit, 2003; Holtzworth-Munroe, 1992). To the extent that anger triggers aggressive cognitive scripts (Huesmann, 1988), interferes with higher-level cognitive processes, and encourages aggressive responding (Berkowitz, 2008), the more likely aggressive scripts are reinforced by hostile interactions within the individual's social environment (Anderson & Bushman, 2002). Thus, a low threshold for experiencing negative affect—including the presence of unpleasant thoughts and emotions—might be a vulnerability factor for aggressive behavior and, in turn, IPV.

The finding that individuals who engage in IPV might be reactive to high levels of experienced negative affect might suggest a different psychological process relating negative emotions and IPV. That is, IPV may be the result of an individual's attempts to escape or control unpleasant internal experiences, such as increased arousal, that occur during an argument with an intimate partner (Langer & Lawrence, 2009). As such, IPV can be conceptualized as a behavior that facilitates escape from the aversive emotional and physiological tension associated with

interpersonal triggers. In addition to the body of literature supporting the link between IPV and negative emotions, studies indicate that individuals who engage in relational violence are more likely to experience greater levels of emotional arousal than non-violent individuals. Investigations using physiological assessment methods have found that male-to-female IPV is associated with increases in heart rate activity during couple communication (Gottman et al., 1995). Additionally, individuals who engage in IPV report experiencing higher levels of aversive internal arousal before and during arguments compared to people without experiences of IPV (Margolin, John, & Gleberman, 1988), as well as tremulousness, vocal changes, heart palpitations, sweating, and breathlessness during violent episodes (George, Anderson, Nutt, & Linnoila, 1989). Such physiological reactions are often perceived by individuals who engage in IPV as being beyond their conscious control (Bitler, Linnoila, & George, 1994). Furthermore, individuals who engage in IPV report that their subjective experience of affect—including negative emotions of anxiety, sadness, and anger—is extremely aversive, with some even reporting fear of their own emotional experience (Jakupcak, 2003). Based on these findings, it seems likely that, for individuals who engage in violent behavior, high levels of emotional and physiological arousal are difficult to tolerate and may result in efforts to avoid or escape from it (Langer & Lawrence, 2009). Thus, the ways in which IPV perpetrators manage their affective arousal and respond to their internal experiences might play a critical role in interpersonal aggression.

Whereas research demonstrates that IPV is closely associated with increased arousal states and the experience and expression of negative emotions, the limitations of this work must be recognized. Primarily, while the link between negative emotions, levels of arousal, and IPV is a compelling perspective, this argument fails to address the notion that individuals who engage

in IPV are not aggressive across all contexts in which the person experiences high levels of negative emotions. More typically, IPV is embedded within specific close relationships (Margolin et al., 1988; Neidig & Friedman, 1984) and, as suggested by observational findings on negative reciprocity in violent couples (e.g., Jacobson et al., 1994), is likewise associated with the interdependence between men's and women's display of negative behavior. Because intimate partners are thought to influence each other's emotions, cognitions, and behavior continuously across time (Butler, 2011), it follows that temporal changes in affective expression during conflict, and dyadic reactions to that expression, might be a driving force behind the specific behavioral patterns that differentiate distressed/violent from distressed/non-violent couples.

A rapidly growing body of empirical evidence demonstrates that studying the interplay between both partners' emotions during an interaction might provide a window into outcomes associated with couples' conversations and interactions (e.g., Boker & Laurenceau, 2006; Butler, 2011, 2015; Schoebi & Randall, 2015; Saxbe & Repetti, 2010). For instance, high bidirectional linkage in negative affect has been linked to interpersonal functioning: Couples who become locked into patterns of negative affect reciprocity and stress responding tend to report higher levels of relationship dissatisfaction (see Timmons, Margolin, & Saxbe, 2015 for review). This work demonstrates that more distressed couples demonstrate rapid, persistent increases (i.e., steep trajectories) in negative emotional expression during conflict and fewer instances of down-regulating negative emotion after escalation (Baucom & Atkins, 2013). Because emotional hyperarousal has been consistently associated with individuals with aggressive tendencies (e.g., Margolin et al., 1988), distressed couples with experiences of male-to-female IPV may have more difficulty de-escalating high levels of arousal. That is, couples experiencing male-to-female violence in relationships may lack the ability to manage negative emotions jointly during a

conflict-based discussion, above and beyond the effect of relational distress. Satisfied couples, on the other hand, are more likely to harness the regulatory capacity of their relationships by being less reactive to, and aroused by, one another's negative emotional display (Bloch, Haase, & Levenson, 2014; Gottman, Coan, Carrere, & Swanson, 1998) and helping partners return to baseline levels of arousal over the course of an interaction (Helm, Sbarra, & Ferrer, 2012). Thus, the presence of satisfaction in relationships has a protective effect on changes in partners' emotional responses over time and could change the influence of IPV on a couple's emotional reactivity.

Unfortunately, while the communication behavior and emotional responses of couples with experiences of male-to-female IPV have been studied over the past several decades in some regards, very little is known about the ways in which emotional arousal continuously unfolds between violent partners within an episode of conflict. This is due, in part, to the methodological limitations of earlier investigations. Often, groups of violent and non-violent men are administered self-report questionnaires asking about their experiences of anger, emotional arousal, or communication with their partner (Eckhardt, Samper, & Murphy, 2008; Holtzworth-Munroe, Rehman, & Herron, 2000); substantive conclusions about the enactment of IPV are then based on between-group differences in self-report. However, as noted elsewhere (Norlander & Eckhardt, 2005), this questionnaire-driven approach is methodologically problematic and raises questions about construct and external validity, especially when data from these measures are used to make conclusions about dynamic processes related to IPV risk. In other investigations, couples with histories of IPV are interviewed and asked to provide information about their conflict strategies and communication styles (e.g., Jacobson et al., 1994; Lloyd, 1990; Stith et al., 2011). Alternatively, men who have previously engaged in IPV are asked to describe their

feelings in reaction to hypothetical audiotaped vignettes of conversations between two romantic partners (e.g., Babcock, Green, Webb, & Yerington, 2005; Barbour, Eckhardt, Davison, & Kassinove, 1998). Although these investigations generate rich qualitative data, they limit our understanding of the quantitative changes in emotional communication patterns within natural dyadic interactions. Finally, observational studies that have measured the physiological arousal of violent and non-violent couples (e.g., Jacobson et al., 1994), communication behavior (e.g., Cordova et al., 1993), and continuous dial ratings of angry emotions experienced by IPV perpetrators (e.g., Costa & Babcock, 2008) predominantly include aggregate findings, presenting (a) average levels of emotion or arousal or (b) the mean probability that a given behavioral sequence will take place during conflict. This, once again, limits the degree to which we can understand how quickly and how much the negative emotions of couples who engage in IPV increase (and decrease) during a conversation. In short, the available data on individuals who engage in IPV either conceptualize emotional responses as a static construct or measure it in ways that limit inferences about moment-to-moment interpersonal processes from being drawn.

To assess emotional reactivity in real time, it is imperative to use a measure that (a) is an appropriate and well-accepted index of emotional arousal, (b) can sensitively capture within-couple fluctuations in arousal as a conversation unfolds, and (c) can lend itself to fine-grained statistical analysis. Although emotional arousal has been captured most often by well-established physiological indices, such as heart rate, blood pressure, and skin conductance (Larsen et al., 2008), as well as by measures of endocrine functioning (Robles & Kiecolt-Glaser, 2003), such techniques introduce a number of challenges during data collection. The equipment is often expensive to obtain, requires that research assistants undergo extensive training to ensure correct usage, and can serve as a distraction for couples during lab-based couple interactions. Also of

great importance, partners cannot access the other person's physiological arousal or endocrine functioning; yet, partners are responsive to each other's emotional arousal. Thus, a measure of emotional arousal is needed that is unobtrusive from a measurement perspective, yet can be communicated between partners. Fortunately, a growing body of evidence suggests that measuring vocal indicators of emotional distress (e.g., fundamental frequency [f_0]) meets these needs.

Fundamental frequency, or the lowest frequency harmonic of the speech sound wave, offers a number of conceptual and methodological benefits when studying emotions in a dyadic context. First, previous research has demonstrated that f_0: (a) conveys information about partners' physiological and subjective experiences of arousal (e.g., Weusthoff, Baucom, & Hahlweg, 2013), (b) is related to maladaptive communication behaviors (e.g., Baucom et al., 2011; Baucom et al., 2015a) and within-conversation interpersonal processes (e.g., Fischer et al., 2017; Weber et al., 2018), and (c) demonstrates concurrent and longitudinal associations with relationship functioning and couple therapy outcomes (e.g., Baucom, Atkins, Simpson, & Christensen, 2009; Baucom et al., 2015b). Thus, f_0 is a robust indicator of socioemotional communication and relationship quality between partners. Second, f_0 captures the nonverbal transmission of emotional arousal that is largely driven by involuntary autonomic processes. In other words, f_0 cannot only be perceived by a partner, but partners respond to one another's f_0 without being aware of this fact (Gregory & Webster, 1996). Third, data collection is non-invasive in nature, only requiring a clear audio recording of the conversation. In this way, f_0 is not susceptible to the same artifacts as physiological measures (e.g., movement) and can be used in post-hoc analyses in studies in which f_0 was not an outcome of initial interest when the study was conducted (Weusthoff et al., 2013). Fourth, because it can be measured continuously over

the course of a conversation, f_0 is a prime candidate for data analytic approaches that model continuous changes within couples (e.g., growth curve modeling, Raudenbush, Brennan, & Barnett, 1995). Also, f_0 is not dependent upon a given language; thus, it can be employed cross-culturally to study changes in emotional arousal during conversations. Therefore, by using f_0 as a measure of emotional arousal, it becomes possible to assess the trajectories of arousal during dyadic interactions.

In summary, previous research suggests that the communication patterns of couples who engage in IPV are reciprocally determined, characterized by interdependent exchanges of anger, hostility, contempt, and belligerence. However, because similar patterns have also been observed in distressed couples without IPV, there is a need to examine the unique influence of violence and relationship distress within conflict-driven interactions of (a) distressed and non-distressed couples as well as (b) violent and non-violent couples. Within this context, dyadic changes in emotional arousal over the course of a conversation is of particular interest. Although heightened emotional arousal is a common experience of individuals who engage in IPV, and emotional interdependence in couples is related to individual and relational well-being (e.g., Saxbe & Repetti, 2010; Sels, Ceulemans, Bulteel, & Kuppens, 2016), no investigation to date has explored detailed patterns of emotional arousal as these unfold during conversations involving couples with histories of male-to-female IPV. Thus, how these patterns change over the course of a conversation, and how they differ as a function of relationship distress and violence, is the focus of the current investigation.

Accordingly, the present study is the first empirical stufy to examine trajectories of vocally-encoded emotional arousal (i.e., f_0) during the conversations of couples with and without relationship distress and experiences of male-to-female IPV. Four groups of couples were

included in this investigation: (a) non-distressed/no-IPV, (b) distressed/no-IPV, (c) distressed/IPV, and (d) non-distressed/IPV. Based on previous studies exploring levels of arousal among men and women (e.g., Titze, 1989), the emotions of individuals who engage in IPV, and the interactions of distressed and violent couples, a series of hypotheses were proposed regarding (a) aggregate emotional arousal (one measure of emotional arousal across the conversation) and (b) trajectories of arousal (that is, how the arousal of two partners shifts over time). Because this paper aims to examine IPV as an interpersonal phenomenon, our hypotheses address emotional arousal in both partners during the conversation. It should be noted that separate hypotheses were not formed for each partner, as there currently is not enough evidence within the IPV literature to suggest that the emotional arousal of men and women might adopt different patterns. However, this exploration will broaden our understanding of emotional communication as a dyadic process in the context of IPV and relationship distress. Ultimately, bridging the gap in our knowledge of emotional arousal within the IPV literature may not only expand our understanding of the ways in which emotions give rise to complex—and destructive—interpersonal dynamics. Doing so may likewise expand process-level theoretical models of IPV risk.

Hypothesis 1. Given the similarities in the communication patterns of (a) violent and (b) distressed couples (e.g., Heyman, 2001; Jacobson et al., 1994), aggregate levels of arousal for men and women with IPV or relationship distress were anticipated to be higher than that of men and women without IPV or relationship distress. As such, the *combination* of distress and IPV will exhibit *additive* effects on emotional arousal, such that (a) men and women in the distressed/IPV group will demonstrate the highest levels of aggregate arousal in the sample and (b) men and women in the non-distressed/no-IPV group will demonstrate the lowest. Due to the limited literature on emotional arousal in couples with relationship distress and IPV, there is no

basis for predicting the relative levels of aggregate arousal comparing distressed/no-IPV and non-distressed/IPV couples; thus, this comparison was viewed as exploratory.

Hypothesis 2. Consistent with the hypotheses on aggregate arousal, changes in emotional arousal across the conversation were also predicted to demonstrate additive effects of relationship distress and IPV. Specifically, relative to couples without IPV, men and women who report IPV (whether distressed or non-distressed) were expected to have higher levels of arousal at the start of their conversation, demonstrate quicker increases in arousal, and de-escalate less by the end of the interaction. In other words, relational violence was anticipated to "speed up" the rate at which partners become more aroused during an interaction and "slow down" the rate at which they are able to return to baseline levels of arousal. Similarly, because distressed couples are prone to engage in negative, destructive communication, distressed couples were expected to demonstrate comparable patterns of arousal: Relative to non-distressed partners, they will begin their interactions with higher levels of arousal, demonstrate quicker increases in arousal over the course of a conversation, and demonstrate less de-escalation by the end of their interactions. Thus, across all four groups of couples, those who report a combination of relationship distress and IPV were expected to demonstrate the *greatest increases* in arousal and the *least de-escalation* over the course of their conversation. Additionally, as noted earlier, given that the literature has not previously explored these questions, differential predictions for patterns of change for men and women are not possible; however, such differences in this paper will be explored, recognizing that gender and the role of perpetrator in male-to-female violence are confounded within this study's design.

CHAPTER 2: METHODS

Participants

Participants included 223 adult heterosexual couples who were living together for at least one year or were married. All couples took part in a study between 1997-2001 designed to measure anger escalation/de-escalation patterns during the interactions of couples with a violent male partner. (For a detailed description of the original study, see Heyman, Slep, Malik, & Baucom, 2019, and Slep, Heyman, & Lorber, 2015.) For the purposes of feasibility within the current investigation, a random sub-sample was selected: 40 couples were randomly chosen from all groups of couples except the non-distressed/IPV group[1] (from which all 29 couples were included), yielding a total N of 149.

Tables 1 and 2 summarize the demographic characteristics of the men and women in the final sample, separated by group membership. Men in the distressed/IPV group were, on average, the oldest (M = 43.93 years, SD = 11.36) and had the fewest average years of education (M = 13.45, SD = 2.40). The majority of men across all four groups were employed full-time (70-80% per group) and predominantly self-identified as non-Hispanic White (80-95% per group). Within the sub-sample of women, those in the non-distressed/IPV group had the youngest mean age (M = 37.72 years, SD = 9.52), whereas those in the distressed/IPV group (like their male counterparts) received approximately 13.46 years of education (SD = 1.67). Among all four groups, the majority of women were fully employed (4-55% per group), with a

[1] Of the four groups of couples, the non-distressed/IPV group yielded the smallest number of participants during recruitment. After accounting for missing data (i.e., eliminating couples without videotaped interactions), the total N of this group was 29 couples.

smaller sub-set reporting part-time employment (12.5-27.55%) or unemployment (15-34.4%) at the time of the study. Additionally, most women self-identified as non-Hispanic White (82.5-97.5% per group). Across all couples (Table 3), both men and women reported a median annual household income ranging from $65,750 (distressed/IPV couples) to $88,250 (non-distressed/IPV couples); reported living with, or being married to, their partner for an average of 12.13 years (*SD* = 7.41; distressed/no-IPV couples) to 13.91 years (*SD* = 12.96; distressed/IPV couples); and, on average, reported having at least one child. Additional demographic information and descriptive statistics are presented in Tables 1, 2, and 3.

Analyses of variance (ANOVAs) revealed differences among the four groups of couples with respect to years of education of both men and women, F_{men} (3,145) = 3.929, p = .010, F_{women}(3,144) = 3.466, p = .018 (Tables 4 and 5). Tukey's post-hoc comparisons indicate that men in the distressed/IPV group (*M* = 13.45, *SD* = 2.40) had significantly fewer years of education relative to men in the non-distressed/no-IPV (*M* = 15.06, *SD* = 2.53) and non-distressed/IPV groups (*M* = 15.05, *SD* = 2.91). Similarly, women in the distressed/IPV group (*M* = 13.46, *SD* = 1.67) had fewer years of education compared to women in the non-distressed/no-IPV group (*M* = 15.03, *SD* = 2.38) (Table 4). With the exception of their relationship satisfaction and IPV scores (which determined group membership and, as such, were expected to yield significant differences), men and women did not differ significantly on the remaining demographic variables.

Measures

Demographics. All participants completed a demographic questionnaire during a one-session laboratory visit.

Relationship satisfaction. The Quality of Marriage Index (QMI; Norton, 1983) is a widely-used six-item measure of relationship satisfaction that possesses excellent internal consistency (Cronbach's alpha > .90) and convergent validity with other measures of relationship satisfaction (e.g., Dyadic Adjustment Scale [DAS]; Spanier, 1976). Respondents of the QMI are asked to rate their agreement with each of the six global items on a Likert-type scale from one (very strong disagreement) to seven (very strong agreement). Total scores on the QMI range from 6 to 45, with higher scores reflecting more positive satisfaction with the relationship. Satisfaction cut-off scores to determine group placement within the current study were based on those commonly used with the DAS. Conversion formulas from Heyman, Sayers, and Bellack (1994) were used to calculate the QMI equivalents of DAS scores, yielding a score of 27 as the cut-off for placement within the distressed groups (DAS<=97, i.e., at or below the clinical threshold for relationship unhappiness) and 37 as the cut-off for the non-distressed groups (DAS=>107, i.e., at or below the median threshold for relational happiness).

Intimate partner violence. The Revised Conflict Tactics Scale (CTS-2; Straus, Hamby, Boney-McCoy, & Sugarman, 1996) is a 78-item self-report measure that captures the frequency of psychological and physical attacks between partners within the past 12 months of a marital, cohabiting, or dating relationship; half of the items pertain to the respondent's behavior and the other half to the partner's behavior. Items assessing physical (e.g., "thrown an object that could hurt," "pushed or shoved," "choked") and psychological aggression (e.g., "insulted or swore," "shouted or yelled," "threatened to hit or throw something") are rated on a scale ranging from zero (never) to six (more than 20 times), and can be differentiated into "mild" and "severe" categories. The factor structure of the CTS-2, along with its internal consistency and construct validity, has been consistently demonstrated across a large number of studies (Straus, 2013),

supporting the CTS-2's use as the gold standard measure of relationship violence. In the current study, IPV couples reported at least two acts of male-to-female mild physical aggression (or one severe act) within the past year of their relationship. No-IPV couples reported either (a) no acts of male-to-female mild or severe physical aggression or (b) only one mild act of mild physical aggression ever in the history of their relationship. Additionally, couples who endorsed acts of psychological aggression only (whether mild or severe) were not disqualified from the study, as this type of aggression is present in most relationships at least occasionally (e.g., O'Leary & Williams, 2006) and often co-occurs with relationship distress (Capaldi et al., 2012; Schumacher, Slep, & Heyman, 2001).

Couple conversation topics. Conversation topics were determined via each partner's completion of the Areas of Change Questionnaire (ACQ; Weiss, Hops, & Patterson, 1973), a 34-item measure that assesses respondents' presenting complaints about their relationship. Each statement corresponds with a specific area of relationship functioning (e.g., "have meals ready on time," "spend time with me"), and respondents rate the degree of change desired from their partner in each of these areas on a seven-point scale, ranging from -3 (much less) to +3 (much more). Substantial support has been offered for the concurrent validity of the ACQ with other measures of relationship adjustment, suggesting that it is an appropriate measure for (a) assessing desired change requested by each partner and (b) identifying issues for videotaped conflict that are central to men's and women's issues with their relationship (Heyman, Hunt, Malik, & Slep, 2009; Margolin, Talovic, & Weinstein, 1983). In the current study, each partner's highest-rated areas of desired change were selected to become the topics of the couples' two conversations. If a partner scored two topic areas identically (i.e., two areas of change were rated as equally

important), a random number generator was used to break the tie and make a final selection of topics for discussion.

Emotional arousal. Vocally-encoded emotional arousal was measured using fundamental frequency (f_0) values derived from videotaped couple interactions. Measured in Hertz (Hz), f_0 is closely associated with perceived pitch (Atkinson, 1978), with higher values indicating rapid opening and closing of the vocal folds used in speech production and greater emotional arousal (Juslin & Scherer, 2005). f_0 is a general index of emotional arousal and is not specific to a given emotion; thus, both positive and negative emotions result in increased arousal as assessed by f_0. Using Audacity 2.1.6 (http://audacity.sourceforge.net), audio recordings from each conversation were manually segmented into separate tracks for men and women. Interfering background noises and nonverbal vocalizations (e.g., laughter, coughing) were removed from both tracks. f_0 estimates were then obtained at each quarter-second interval using Praat, a freely available software package (Boersma & Weenink, 2010). A bandpass filter of 75 to 300 Hz was used to restrict f_0 estimates to the range of typical human speech (Owen & Bachorowski, 2007). Consistent with the natural flow of conversation, mean f_0 was calculated by averaging the f_0 estimates within each talk turn (i.e., time during which one person speaks) per partner. Prior to analysis, visual inspection of f_0 plots for each couple, as well as statistical checks and diagnostics, were used to ensure data quality.

Procedure

Couples were recruited using a random-digit-dialing phone screen procedure (see Slep, Heyman, Williams, Van Dyke, & O'Leary, 2006 for detailed overview). The partner who first answered the phone—male or female—answered questions based on the study's entry criteria. To be eligible for the study, participants needed to be (a) residing within English-speaking

households and (b) co-habiting with their partner for at least one year or married. During the phone screen, additional information was gathered on their (a) racial/ethnic membership, (b) the ages of the children in their household, and (c) annual household income. Eligible respondents then completed the QMI and the mild physical aggression items of the CTS-2 (for the past year and ever in the relationship) to determine the couple's potential distress/IPV classification. The final determination, however, was made during the couple's lab visit, where *both partners* were asked to complete the QMI and CTS-2.

The inclusion criteria for each group were as follows: (a) Non-distressed/no-IPV: At least one partner scored above 37 on the QMI, and both partners' combined CTS-2 reports indicated no more than one act of male-to-female mild physical aggression in the history of their relationship; (b) Distressed/no-IPV: At least one partner scored below 27 on the QMI, and both partners reported no more than one act of mild physical aggression in the relationship; (c) Distressed/IPV: At least one partner scored below 27 on the QMI, and the partners' combined report revealed at least two acts of male-to-female mild physical aggression (or one severe act) within the past year; and (d) Non-distressed/IPV: At least one partner scored above 37 on the QMI, and both reported at least two acts of male-to-female mild physical aggression (or one severe act) within the past year. Couples who did not meet these criteria during their lab visit were excluded from the final sample and from all analyses. Exclusionary criteria included instances in which one partner reported high relationship satisfaction (QMI>37) and the other partner reported significant relationship distress (QMI<27). In other words, to obtain "pure" couple categories, partners could not simultaneously be in the distressed and non-distressed groups; however, *both* partners did not need to meet the *same* QMI criteria to be placed into the same cell. That is, whereas one partner needed to meet either the distressed or non-distressed cut-

off scores, the other may have scored either above or below these thresholds, so long as s/he did not meet criteria for another group. For example, if one partner met the QMI criteria for relationship distress (QMI<27), but their partner's score ranged between the cut-off scores for relationship distress and satisfaction (27<QMI>37), the couple would be categorized within one of the two distressed groups. A similar rule applied to relationally satisfied couples: If one partner met the QMI criteria for high relationship satisfaction (QMI>37), but their partner scored between 27 and 37 on the QMI, the couple would be placed within one of the two non-distressed groups. Additionally, couples who endorsed only one act of mild physical aggression within the past year, but more than one mild act of physical aggression within the duration of their relationship, were excluded from the study, as they did not meet the CTS-2 inclusion criteria.

After recruitment, couples were invited to the lab for a 3-hour visit. All couples provided their consent prior to data collection. Both partners completed packets of questionnaires in separate rooms. Once finished, a research assistant reviewed their ACQ responses and determined the top two areas of change selected by the female partner; only one area of change was selected for the male. Each topic corresponded to one 10-minute video-taped conversation per couple, for a total of three conflict discussions. The first, considered a "warm-up" conversation, covered one of the female's topics. During this conversation, the partners were instructed to "get somewhere with the topic" while behaving at "their best." During the second and third conversations (female and male "typical" conversations), couples were told, "We'd like to see you demonstrate how you typically discuss problems when you are at home. We've already seen what it's like when you're at your best, and this time, we'd like to see what it's like when you're not at your best, but just being yourselves." In an effort to capture interactions that are most representative of the couples' communication styles, the "warm-up" interactions were

excluded from the current investigation. After completing the protocol, all couples were compensated for their time in the study and provided with a list of community resources.

CHAPTER 3: RESULTS

Level of Violence Among Couples

Different rates of mild and severe physical violence were reported among the four groups (Table 6). First, consistent with the current CTS-2 selection criteria for male-to-female violence, the majority of men in the no-IPV groups reported zero acts of mild physical violence within the history of their relationship. This included approximately 95% of men in non-distressed/no-IPV and 82.5% in distressed/no-IPV relationships. Because men in the no-IPV groups were allowed to report up to one act of mild physical violence in their relationship, there was some evidence of men who reported a single violent act. As noted earlier, having one mild act of physical aggression (e.g., grabbing partner's arm during an argument) over the course of the relationship did not exclude these men from the study, as this form of behavior tends to be common in relationships and is not always indicative of a long-standing pattern of violence. No men in either the non-distressed/no-IPV or distressed/no-IPV groups reported severe acts of physical violence.

Conversely, the majority of men in the IPV groups reported a wider range of IPV. Among non-distressed/IPV men, approximately 65% reported two to three acts of mild physical IPV within the past year of their relationship, whereas most did not endorse any severe violence. Among distressed/IPV men, on the other hand, the majority endorsed over four acts of mild physical and more than one act of severe physical IPV.

Additionally, bilateral violence was present in the sample. That is, despite selecting for male-to-female violence, among no-IPV and IPV couples, women also admit to engaging in at least some violent behavior. Notably, 10% of non-distressed/no-IPV women reported up to one

act of mild physical violence. Distressed/no-IPV women indicated a greater frequency of physical violence, with some reporting over seven mild instances and at least one severe act in their relationship. Conversely, the rates of female violence within the IPV groups were notably higher. Among non-distressed/IPV women, 75.5% reported at least one mild physical act, and 27.5% reported at least one severe physical act. Among distressed/IPV women, approximately half reported over seven mild physically violent acts within the past year and at least one act of severe physical IPV.

Data Analytic Strategy for Testing Hypotheses

Analyses were conducted by estimating a series of multi-level models (MLMs) in SAS 9.4 (SAS Institute Inc., 2013) using PROC MIXED. MLMs are ideal to examine the current hypotheses because they adjust for the non-independence of observations created by the nesting of (a) individuals within couples and (b) talk-turns within individuals. All models were conducted as two-intercept models for distinguishable dyads, which resulted in separate estimates for men and women while accounting for data nesting. Additionally, all models were estimated using Maximum Likelihood Estimation and unstructured, heterogeneous error structures. Specific tests examining each hypothesis and exploratory aim are described in greater detail below.

Hypothesis Testing

Aggregate emotional arousal. To examine our hypotheses regarding *overall* differences in emotional arousal between groups over the 10-minute conversations, *aggregate* levels of arousal were compared between partners within and across groups using a two-level MLM (i.e., individuals nested within couples). Overall mean f_0 was regressed onto partner sex and group membership to test differences in overall arousal (a) between men and women within each

group, (b) between women across groups, and (c) between men across groups. Furthermore, because there is evidence to suggest that partner behavior differs when men versus women ask for change (e.g., Christensen & Heavey, 1990; Heyman et al., 2009), we controlled for this possibility by including conversation topic (male or female) as a covariate in our model.

Hypothesis 1. Table 7 presents the parameter estimates for overall levels of mean f_0 for men and women within each group. First, consistent with the expected f_0 differences between men and women due to the anatomical structures involved in voice production (Titze, 1989), women's overall mean f_0 was significantly higher than that of men's ($p < .001$). This finding does not suggest that women are "more emotional" that men, but rather that due to differences in their vocal chords compared to men, women demonstrate higher levels of fundamental frequency in their speech production. Second, men's and women's mean f_0 were expected to differ significantly between groups, with partners in the distressed/IPV group evidencing the highest overall levels of arousal and non-distressed/no-IPV couples demonstrating the lowest levels of arousal among the four groups. However, there was no support for this hypothesis: The aggregate f_0 values for men ($F(3, 432) = 1.13$, $p = .34$) and women ($F(3, 432) = 0.84$, $p = .47$) did not vary depending on group membership, indicating that men's and women's respective levels of overall arousal were similar across relationship distress/IPV classifications.

Trajectories of emotional arousal. To examine *changes* in arousal over the course of both couple conversations *between partners within groups*, trajectories of mean f_0 were tested with a two-level growth curve MLM that included the main effects of and interactions between partner sex and time. Here, for each group of couples, mean f_0 was regressed onto Time and $Time^2$ to examine both linear and quadratic effects of time on changes in emotional arousal among partners, resulting in a total of four models. Parameter estimates from these models

represent the following: (a) the mean intercept indicates the average levels of arousal at which partners initiate each conversation; (b) Time indicates whether a mean linear trend (i.e., straight-line change) exists in men's and women's f_0 trajectories, estimating the slope in each partner's mean f_0 at the start of each conversation; and (c) Time and Time^2 indicate whether a quadratic trend (i.e., curved rate of change) exists in each partner's mean f_0, estimating change in mean f_0 during later portions of each conversation. Fixed effect estimates and Empirical Bayes Residuals from these models were combined to generate intercept, linear, and quadratic values for each partner. Conversation topic was once again included as a covariate to control for the potential influence of requests for change from men versus women. The following mixed model equation illustrates the two-level models used to examine changes in mean f_0 for each partner *within* each of the four groups over the course of the 10-minute conversations:

$$\text{Mean } f_{0tij} = \beta_0 + \beta_1*\text{Female} + \beta_2*(\text{Female x Topic}) + \beta_3*(\text{Female x Time}) + \beta_4*(\text{Female x Time}^2) + \beta_5*\text{Male} + \beta_6*(\text{Male x Topic}) + \beta_7*(\text{Male x Time}) + \beta_8*(\text{Male x Time}^2) + u_{00j} + r_{0ij} + e_{tij}$$

where *t* indexes time during the discussion, *i* indexes partners, and *j* indexes couples. Due to the complexity of the given growth curve models relative to the overall sample size, the effects of relationship distress and IPV (a) within groups and (b) between groups could not be examined simultaneously within a single model. Thus, the aforementioned equation for within-group effects was then expanded to examine the degree to which these trajectories of emotional arousal change as a function of relationship distress, IPV, and/or partner sex (i.e., between groups). This 3-way interaction model is described by the following equation:

$$\text{Mean } f_{0tij} = \beta_0 + \beta_1*\text{Topic} + \beta_2*\text{Partner} + \beta_3*\text{Time} + \beta_4*\text{Time}^2 + \beta_5*\text{IPV} + \beta_6*\text{Relationship Distress} + \beta_7*(\text{Partner x Time}) + \beta_8*(\text{Partner x Time}^2) + \beta_9*(\text{IPV x Time}) + \beta_{10}*(\text{IPV x Time}^2) + \beta_{11}*(\text{Relationship Distress x Time}) + \beta_{12}*(\text{Relationship Distress x Time}^2) + \beta_{13}*(\text{IPV x Partner}) + \beta_{14}*(\text{IPV x Partner x Time}) + \beta_{15}*(\text{IPV x Partner x Time}^2) + \beta_{16}*(\text{Relationship Distress x Partner}) + \beta_{17}*(\text{Relationship Distress x Partner x Time}) + \beta_{18}*(\text{Relationship Distress x Partner x Time}^2) + \beta_{19}*(\text{Relationship}$$

Distress x IPV) + β_{20}*(Relationship Distress x IPV x Time) + β_{21}*(Relationship Distress x IPV x Time^2) + β_{22}*(Relationship Distress x IPV x Partner) + β_{23}*(Relationship Distress x IPV x Partner x Time) + β_{24}*(Relationship Distress x IPV x Partner x Time^2) + u_{00j} + u_{1j}*Time + u_{2j}*Time^2 + r_{0ij} + e_{tij}

where relationship distress, IPV, and partner variables are dummy codes contrasting (a) the presence and absence of relationship distress among couples (e.g., absence = 0, presence = 1), (b) the presence and absence of IPV, and (c) men versus women. Interactions between dummy codes and the time variables tested whether the linear and quadratic effects of time on emotional arousal vary by group classification and/or partner sex.

Hypothesis 2. Men and women in all groups were expected to demonstrate quadratic change over the course of the 10-minute conversations; that is, partners were expected to demonstrate increases in emotional arousal at the start of conversation and some de-escalation by the end. However, level of arousal at the start of the conversation, the steepness of increases in arousal, and the shape of later decreases in arousal were anticipated to differ as a function of relationship distress and IPV. Specifically, relationship distress and IPV were expected to confer similar effects on changes in emotional arousal over the course of the conversation, such that distressed/IPV partners would evidence highest levels of arousal at the start of their conversation, the steepest increases in arousal, and the least amount of de-escalation by the end of their conversation. In line with these predictions, distressed/no-IPV and non-distressed/IPV partners were expected to exhibit less prominent increases and greater de-escalation during later portions of their conversation, relative to distressed/IPV couples.

Results of the partner-level growth curve models are presented in Table 8. Notably, among non-distressed/no-IPV couples, neither men nor women demonstrated significant linear or quadratic changes in emotional arousal over the course of their conversations. That is, both partners within this group maintained stable levels of arousal across their 10-minute discussion.

Within distressed/no-IPV and non-distressed/IPV relationships, however, a significant quadratic effect of time emerged for men and women respectively; both partners exhibited trajectories that reflect increases of arousal at the start of the conversation and de-escalation, to an extent, by the end. These trajectories stand in contrast to those demonstrated by partners in distressed/IPV couples. Here, a significant quadratic trend emerged for women, whereas a significant linear trend was evident for men. This suggests an opposing pattern of emotional communication between partners, with women de-escalating heightened levels of arousal by the end of the conversation and men in distressed/IPV couples demonstrating continuous increases in arousal across the conversation.

Figures 1 and 2 present the plots of these partner-level trajectories across all groups. Upon examination, it becomes clear that the patterns described above do not support the hypotheses regarding the additive effects of relationship distress and IPV on emotional arousal. Specifically, it was predicted that partners in the distressed/IPV groups might exhibit overall trajectories similar to distressed/no IPV and non-distressed/IPV groups, though at higher levels of arousal. The plots, however, illustrate what appears to be an *interaction effect* – that is, the presence of relationship distress and IPV yield trajectories for men and women that differ not only in *degree* of arousal, but also in the *shape* of the curve.

In particular, as indicated by the partner-level estimates, men and women in distressed/no-IPV relationships increase in arousal across the conversation, demonstrating marginal decreases by the end. Whereas we expected men and women in the distressed/IPV group to display similar trajectories at higher mean f_0 values, both plots illustrate unique patterns for each partner. Although distressed/IPV women evidence quadratic change, the shape of their curve is qualitatively different than that of women in the distressed/no IPV group. In fact, it is

characterized by a more prominent pattern of de-escalation: After experiencing increases in arousal, by the end of the discussion, women in the distressed/IPV couples decrease to a level close to the point at which they began the conversation (i.e., their intercept). Men in the distressed/IPV couples, on the other hand, demonstrate linear change without evidence of de-escalation during later portions of the conversation. Conversely, partners in the non-distressed/IPV group (who, due to the presence of violence only, were predicted to have trajectories of arousal most similar to the distressed/no-IPV couples) demonstrated patterns of arousal most similar to women in the distressed/IPV group. That is, both men and women in the non-distressed/IPV group appear to experience decreases in arousal that bring them approximately back to their initial levels of arousal at the outset of the conversation.

Taken together, these findings support two primary conclusions: (a) the presence of IPV in distressed and non-distressed couples results in patterns of arousal that are distinct from those of partners who report relationship distress only; and (b) a sex difference exists for the simultaneous presence of both relationship distress and IPV on emotional communication, such that men (relative to women) exhibit greater difficulty down-regulating their emotions during conflict.

To elaborate on our observations regarding the presence of an interaction between relationship distress and IPV, results from the 3-way interaction model examining the differential effects of relationship distress, IPV, and partner sex on changes in emotional arousal are presented in Table 9. Findings from this model lend partial support for our conclusions from the growth curve plots. As anticipated, significant effects emerged for the association between IPV and relationship distress on linear (β = -3.347, t(10,467) = -3.91, $p < .001$) and quadratic changes in arousal (β = 0.25, t(10,467) = 3.02, p = .003). This suggests that the linear and quadratic

trajectories described earlier vary as a function of the presence or absence of these two variables. However, these same effects do not vary by partner. Interactions between relationship distress, IPV, and partner sex were not significant with respect to the linear (β = -0.92, t(10,467) = -0.54, p = .59) or quadratic effects of time (β = 0.03, t(10,467) = 0.17, p = .87). At first blush, this finding might appear counterintuitive due to the differential patterns of emotional arousal observed in distressed/IPV men and women. Yet, given the association among these variables requires testing a 4-way interaction (i.e., relationship distress x IPV x partner sex x Time), it is possible we did not have enough power to detect this effect. As such, when looking at the role of partner sex relative to relationship distress and IPV, these effects might be best understood when solely examining the partner-level growth curve models.

Additional Exploratory Analyses

Differences in trajectories of emotional arousal. Because little research exists on emotional arousal in men and women within the context of IPV and relationship distress, we sought to examine the extent to which partners' trajectories of emotional arousal differ significantly from one another. Thus, a series of contrasts were conducted, comparing the fixed effect estimates of the aforementioned partner-level growth curve models. First, dummy coding of partner (men versus women), group (non-distressed/no-IPV, distressed/no-IPV, distressed/IPV, and non-distressed/IPV), Time, and Time^2 variables tested the *combined* effects of time (or, in other words, the average of the intercept, linear, and quadratic effects) on changes in emotional arousal among (a) men and women within each group, (b) women across groups, and (c) men across groups. Estimates from these comparisons indicate whether, on average, men's and women's trajectories differ from one another over the course of the 10-minute conversation; however, these estimates do not provide information regarding which growth curve

estimates (intercept, linear, or quadratic values) might be "driving" these observed differences. Thus, to address the latter, the same series of contrasts were tested, this time examining differences among the separate intercept, linear, and quadratic values for men and women within and across groups. Estimates from these comparisons characterized the magnitude of difference between partners' (a) average levels of arousal at the start of their conversation and (b) linear or curved rates of change across the conversation.

Results from the contrasts examining differences in partners' mean f_0 trajectories within and between groups are presented in Tables 10-13. First, turning to the findings associated with the *combined* effects of time *within* groups (Table 10), men and women exhibited significantly different patterns of arousal within the distressed groups (both IPV and no IPV), but not within non-distressed/no-IPV and non-distressed/IPV groups. Consistent with the patterns observed from the partner-level growth curve models and plots, differences in arousal among distressed/IPV men and women can be attributed to the presence of a quadratic effect of time for women but not men (Table 11). Similarly, the lack of a difference between men's and women's trajectories within the non-distressed groups can also be explained by the similar effects of time on emotional arousal across both partners (i.e., neither linear nor quadratic trends for non-distressed/no-IPV men and women; prominent quadratic changes in arousal for non-distressed/IPV men and women; Table 11). However, for distressed/no-IPV men and women, despite the statistical difference in their mean f_0 trajectories, the corresponding plot for this group does not suggest any obvious visual difference between men's and women's curves. As such, this significant finding should be interpreted with caution.

Next, in examining the *combined* effects of time *between* groups, findings from these analyses were also largely consistent with emergent patterns from the partner-level growth curve

models and plots. In particular, men exhibited significantly different trajectories of emotional arousal across all but the non-distressed groups (no-IPV and IPV), with the magnitude of difference in the quadratic effect emerging as marginally significant (β = 0.16, t(10,467) = 1.81, p = .07; Table 12) On the other hand, women's trajectories of arousal were significantly different for all but the following group comparisons: (a) distressed/no-IPV vs. non-distressed/IPV, and (b) distressed/IPV vs. non-distressed/IPV (Table 13). More specifically, the differences between women in the distressed/no-IPV and non-distressed/IPV groups approached significance (F(2, 10,467) = 2.96, p = .052), with these effects decomposing after examining differences among the intercept, linear, and quadratic effects. Separately, as anticipated from the partner-level estimates and plots, women in the IPV groups (both distressed and non-distressed) did not differ with respect to their linear (β = -0.38, t(10,467) = -0.43, p = .67) or quadratic trends (β = -0.001, t(10,467) = -0.01, p = .99), exhibiting similar patterns across the conversation.

Summary

The associations among relationship distress and IPV with emotional arousal were examined by testing the differences in (a) aggregate mean f_0 and (b) trajectories of mean f_0 between men and women across all distress/IPV classifications. Contrary to our hypotheses, findings indicate that emotional arousal changed differentially based on the presence of IPV and relationship distress. Notably, an interaction effect generated four distinct patterns of arousal. Specifically, relationship distress and IPV resulted in different patterns of emotional communication for the two sexes: Men within the distressed/IPV group demonstrated continuous linear increases in arousal, compared to distressed/IPV women, who demonstrated overall patterns of de-escalation by the end of the conversation. Men and women in all other groups mirrored each other's trajectories – that is, both partners' patterns of arousal either remained flat

(in the case of the non-distressed/no-IPV group), or escalated and then de-escalated to an extent, by the end of the conversation (in the case of the distressed/no-IPV and non-distressed/IPV groups).

CHAPTER 4: DISCUSSION

Relationship and IPV scholars alike have often assumed that relationship distress plays a role in the communication behavior of couples with experiences of IPV. Various theories of IPV suggest that mild forms of physical violence between partners arise out of problems with conflict management and eroded relationship satisfaction (e.g., Kelly & Johnson, 2008; O'Leary et al., 2007; Stith et al., 2008). Moreover, previous research on the correlates of relationship violence has explored communication differences between distressed/violent and distressed/non-violent couples. Notably, a handful of seminal investigations have demonstrated that both types of couples exhibit destructive interactional profiles (e.g., Burman et al., 1993; Cordova et al., 1993; Jacobson et al., 1994). Yet, despite the centrality of this previous work to our current understanding of violent partner behavior, little research has been conducted to disentangle the *combined*, or *interactive*, influence of distress and violence on couples' emotional expression and communication. This has left the field with questions regarding the factors that set apart distressed couples who are violent from distressed couples who do not engage in violence. Building on previous work, the current study is one of the first to address this question, exploring couples' changes in emotional arousal in the presence and absence of relationship distress and male-to-female physical IPV.

Summary of Findings

In comparing the results of the current study to those of previous investigations on communication in IPV couples, it is clear that the current findings do not entirely dovetail with this previous body of IPV literature. Whereas other studies have indicated that both corrosive

communication and heightened emotional arousal are associated with IPV (Cordova et al., 1993; Jacobson et al., 1994; Margolin et al., 1988), our findings suggest that the ways in which men who engage in IPV and their female partners manage their levels of arousal might be differentially influenced by their *degree* of relationship satisfaction.

Specifically, within both IPV groups in our sample, women's level of arousal increased gradually over the course of the conversation, reversed course, and decreased toward the end of the conversation. This suggests that, in relationships where IPV is present, women—regardless of their experience of relational distress or satisfaction—may experience some arousal when discussing a conflictual topic with their partner but are able to de-escalate as the interaction progresses. (That women experiencing IPV are able to bring their levels of arousal down irrespective of their relationship satisfaction does warrant further attention, as these similar patterns might serve different purposes within their specific relational contexts. This will be given further consideration below.)

Men engaging in IPV, on the other hand, demonstrated different changes in arousal depending on their experience of relationship distress. Like the women in non-distressed/IPV relationships, men who report relationship satisfaction also had a parabolic shape to their emotional arousal: They experienced some escalation in arousal as they discussed a relationship problem and de-escalated after escalation occurred. In other words, as the couple continued to engage in the conversation, men were able to calm down and discuss the topic in a way that brought their emotional arousal to a lower level. Men in distressed/IPV relationships, however, did not demonstrate any decreases in arousal. In fact, they were the *only* subset of participants who exhibited continuous increases in arousal across the conversation. That is, once

distressed/IPV men became emotionally aroused during conflict with their partner, their levels of arousal may have been more challenging to contain, resulting in continuous escalation.

Taken together, these patterns are quite different from our initial conceptualization of the ways in which men and women who report male-to-female IPV express and manage their emotions. Because (a) IPV couples are more likely to demonstrate and reciprocate angry, belligerent, and contemptuous behavior than non-violent couples (e.g., Margolin et al., 1988; Jacobson et al., 1994), and (b) men who engage in IPV appear to struggle with affect regulation during conflictual interactions (e.g., Stith et al., 2011; Whiting et al., 2014), it was assumed that couples in the IPV groups would similarly struggle to dampen their levels of emotional arousal across the conversation. Moreover, in distressed relationships (as in relationships characterized by physical violence), partners have been shown to engage in patterns of negative reciprocity and negative affective responding (Heyman, 2001). Therefore, the combination of relationship distress and IPV was predicted to have an especially potent effect on couples' trajectories of emotional arousal.

More specifically, distressed/IPV men demonstrate trajectories that are *distinct* from those exhibited by partners with other relationship characteristics. Namely, men within this group appear to be less effective in calming their emotional arousal, whereas (a) distressed/IPV women and (b) non-distressed men who engage in IPV and their female partners demonstrate seemingly more adaptive patterns of emotional communication. In short, despite the general presumption that escalation in emotional expression and communication is a hallmark of relational violence, current findings suggest that *qualitatively different* patterns of arousal—some of which are characterized by de-escalation—can also be associated with IPV.

As such, these results present a challenge to the notion that male-perpetrated IPV is routinely associated with deficits in emotion regulation and communication. It has been documented—both empirically and theoretically—that individuals who engage in IPV might be especially sensitive to the experience of negative emotion or physiological arousal (e.g., Babcock et al., 2001; Gottman et al., 1995). Some have suggested that individuals who engage in IPV not only experience greater levels of emotional arousal and anger (e.g., Gottman et al., 1995; Dutton, 2010), but also have a lower tolerance for internal arousal before and during arguments with a partner (e.g., Margolin et al. 1988). Additionally, interpersonal theories of IPV argue that partners who engage in physical aggression might do so because they possess fewer effective verbal conflict skills and frequently rely on overlearned, automatic, and easily executable strategies to navigate interpersonal conflict (Gottman, 1994; Patterson, 1982). Although these observations might be true of *some* couples who engage in violent behavior, they are not applicable to all. Notably, our findings reinforce the ubiquitous conclusion that a single path does not lead to the perpetration of physical IPV. Rather, the experience of relationship distress versus satisfaction might enact different emotional vulnerabilities and psychological processes among men who engage in IPV and their female partners.

Emotional Arousal in Couples with IPV: *Distressed Men and Women*

Indeed, among men in both IPV groups, the trajectories of emotional arousal might be best interpreted within a diathesis-stress framework: If men who engage in IPV possess a vulnerability for poor tolerance of emotional arousal, it could be argued this vulnerability serves as a *diathesis* that is (a) easily triggered within unhealthy relationship contexts or (b) suppressed within happy relationships. That is, relationship distress operates as a *stressor* leading to increases in arousal over a conversation, whereas relationship satisfaction is a *protective factor*

contributing to emotional de-escalation over time. Thus, neither the diathesis nor the environmental context is the sole determinant of the outcomes observed among men who engage in IPV. Rather, we propose that the interaction between factors is key: Relationship quality might be pivotal in the emotion regulation processes of men who have an exaggerated sensitivity to their experience of arousal. It is one milieu through which such dispositions are either activated or inhibited.

To elaborate, within the context of relationship distress, pre-existing emotional vulnerabilities might be exacerbated by the taxing nature of dysfunctional relationship dynamics. It has been well-documented that distressed relationships serve as a broad, chronic stressor on both partners involved and can likewise precipitate and maintain individual psychological and physical difficulties (Baucom et al., 2020; Robles, Slatcher, Trombello, & McGinn, 2014; Whisman & Uebelacker, 2006). As such, distressed relationships are social environments in which romantic partners encounter painful emotional experiences that are intense, impactful, and otherwise difficult to control. For distressed men especially, this difficulty might take the form of emotional flooding—a phenomenon in which an individual views their partner's expression of negative affect as unexpected, overwhelming, and disorganizing (Gottman, 1993). Compared to women, men in distressed relationships have been found to experience flooding in response to less intense negative affect and behavior during couple conflict (Gottman, 1993). When arguing with their partner, this sensitivity can lead men to react quickly with negative emotion, contributing to the development of (a) consistent patterns of negative interaction marked by high emotional arousal, hostility, and withdrawal, (b) less closeness and intimacy, and (c) more individual and relationship distress over time (Fruzzetti & Worrell, 2010). Thus, unhappy relationships are emotionally dysregulating: They have great potential to impact an individual's

sensitivity and reactivity to emotionally-relevant cues, make partners more susceptible to the experience of chronic negative emotions, and create additional sources of stress for the individual.

Extending this logic to the phenomenon of IPV, the experience of relationship distress might activate men's sensitivity to emotional arousal during interactions with their partner. That is, men who are (a) unhappy in their relationship and (b) already possess a low threshold for emotional arousal (as in the case of IPV) might be *even more* reactive to their partner's affective display. The chronic, diffuse nature of their relationship distress—along with the negative communication behavior frequently displayed by distressed partners—might be factors that put men with IPV tendencies at greater risk for quickly reaching a high level of arousal and experiencing a loss of emotional control (e.g., flooding). This explanation not only supports empirical work demonstrating the associations between emotional flooding and physical IPV perpetration in men (e.g., O'Leary et al., 2007); it also parallels the personal accounts of men who have engaged in IPV. For instance, men interviewed by Whiting et al. (2014) indicated that they quickly reach their "emotional threshold" when interacting with their partner and feel they are not in control of their behavior during arguments. Similarly, Stith et al. (2011) reported that men who engage in physically violent behavior describe patterns of emotional escalation that suggest a loss of control, using phrases such as "blowing up," "exploding and "losing it" to highlight their emotional experience. In short, men view their physical violence as a fast, out-of-control escalation that often occurs with little thought—giving support to our argument that the unique combination of low tolerance for emotional arousal and contextual stressors (e.g., relational unhappiness) might contribute to the emotional escalation observed among distressed/IPV men.

Diathesis-stress mechanisms, however, are often complex; they are not as simple as the interaction between a single diathesis and a single environmental stressor (as indicated above). More accurately, the interaction between these variables might lead to a *cascade* of other behaviors that facilitate the occurrence of a particular outcome. From this lens, the loss of emotional control among distressed/IPV men could initiate other behaviors that further decrease opportunities for de-escalation. Specifically, another contributing factor to men's unique trajectories of arousal is their use of effective emotion regulation and communication skills. In states of high emotional arousal, partners often cannot optimally solve problems, communicate clearly, or perform the complex tasks needed to negotiate difficult interpersonal situations (Fruzzetti & Worrell, 2010). It is possible, then, that the distressed/IPV men in our sample might not only experience emotional arousal more quickly and intensely than others; the dysregulating effects of their emotional experience might also become an "absorbing state" (Gottman, 1994) and stymy their ability to implement effective response strategies during conflict, leading to further increases in arousal.

Bearing in mind the above explanation, it is equally important to consider reasons why women within the distressed/IPV group did not exhibit similar patterns of emotional escalation compared to men. If both partners in distressed/IPV relationships are known to engage in negative reciprocity during conflict (e.g., Cordova et al., 1993), one might assume women would likewise experience continuous increases in arousal. Yet, strikingly, within our sample, women eventually de-escalated during later portions of the conversation. Indeed, women might be placating their male partner by lowering their levels of arousal in response to their partner's aversive emotional expression. As evidenced by their initial escalation in arousal, women might first respond to men's dysregulation by becoming more emotionally aroused themselves. Given

the common nature of reciprocal responding during early stages of conflict among distressed partners (Heyman, 2001), this mutual escalation is typical, and thus, expected. However, given that the continued emotional dysregulation of men might be a "warning sign" of impending physical violence, reciprocity might slowly come to an end as the conversation progresses. Women might be skilled at recognizing the "danger zone" of conflict and de-escalate during later phases of the interaction prior to risking further retaliation from their partner. Thus, women are caught in a delicate emotional balancing act, in which they are able to express their emotional concerns to a certain extent without further antagonizing their male partner. Unfortunately, this "skilled" behavior is futile: Distressed/IPV men do not appear to change the overall direction of their emotional arousal in response to women's de-escalation. Instead, women's de-escalation might reinforce men's negative emotional expression and inadvertently strengthen his levels of arousal.

Thus, in light of previous findings regarding negative reciprocity among distressed/IPV couples, the notion that women placate their partners raises an important observation about dyadic behavior in relationships with physical IPV: Negative reciprocity (and in turn, mutual escalation in arousal) might only represent a *portion* of conflict behavior between partners. As noted above, when examining continuous changes in men's and women's emotional expression, an approach-withdraw pattern might best describe the behavior of female partners, whereas an ongoing approach pattern might be descriptive of males. Because our current growth curve analyses estimate *overall* patterns in arousal and do not directly test moment-to-moment emotional reciprocity as other models might (e.g., actor-partner interdependence models, Kenny et al., 2006), additional research should systematically test these interpretations of the data.

However, this study is not the first to suggest that women might escalate and then "back down" in the face of men's negative communication during conflict; similar observations regarding negative reciprocity and emotional de-escalation have been put forth by other examinations of physical IPV. Paired with the current findings, these descriptions of communication behavior suggest that sequential approach and withdrawal tendencies might be a robust pattern of responding for women partnered with IPV men.

For instance, Margolin et al. (1988) demonstrated that men in relationships with mild physical IPV exhibited overt negative behavior and reported more physiological arousal compared to their non-violent counterparts. Women, on the other hand, not only engaged in negative reciprocity by increasing their own negative behavioral expression during middle portions of a conversation with their partner; they also managed to decrease their expression of negative behavior by the end—an indication that women might be walking a fine line between escalation and fear of upsetting their partner. Additionally, Stith et al. (2011)—in their description of conflict strategies of distressed couples for whom mild, situational violence is a problem—noted that, after mutual escalation, some women might be prone to emotionally withdraw during interactions with their partner—in other words, "throwing in the towel" when conflict arises. Clinical descriptions of couples with moderate-to-severe violence reflect a similar story. In particular, Walker (1984) noted that women who have husbands with a history of violence tend to withdraw during arguments to avoid provoking their partner. Together, these examples highlight the utility of looking beyond broad constructs such as negative reciprocity over an entire conversation, examining the degree to which each partner's behavior shifts within a conversation, and noticing a variety of communication profiles that might characterize the behavior of partners in IPV relationships. That is, women in distressed/IPV relationships might

not exclusively (a) reciprocate their partner's negative behavior (Cordova et al., 1993) *or* (b) play a passive or withdrawing role during conflict. Instead, they might engage in a *combination* of both forms of behavior, depending on the progression of the conversation.

Emotional Arousal in Couples with IPV: *Non-distressed Men and Women*

Turning to non-distressed/IPV couples, the application of the aforementioned diathesis-stress framework for men who engage in IPV is a relevant consideration. Primarily, the adaptive trajectories of arousal evidenced by both men and women in this group might be explained by the ways in which relationship satisfaction enhances effective communication between partners. Whereas relationship *distress* might exacerbate the emotional vulnerabilities of men who engage in IPV, relationship *satisfaction* might buffer their emotional sensitivity and reactivity. Notably, healthy relationships possess an emotional atmosphere that can (a) be a source of rewarding emotional connection and security for both partners, and (b) bolster an individual's health and well-being (Baucom et al., 2020). For this reason, during difficult times, satisfaction in couples can facilitate less effortful emotion regulation: Satisfied partners demonstrate less reactivity to one another's emotional arousal (Bloch et al., 2014; Gottman et al., 1998) and help one another decrease in arousal over the course of a conversation (Helm et al., 2012). Thus, while men who engage in violent behavior might possess a sensitivity for emotional arousal, within the context of relationship satisfaction, they might be better able to harness the regulatory capacity of their relationship and de-escalate in arousal after becoming upset. Similarly, the same may be true of women, as previous research indicates that both partners in satisfied relationships manage to disrupt joint escalation of negative emotions and express their perspectives without being flooded with affect (Timmons et al., 2015). Thus, for women, although the form of their emotional arousal is ostensibly similar to that of distressed/IPV women, it might be associated

with different communication behavior. Unlike distressed/IPV women, who might engage in approach-withdrawal patterns, and men, who might poorly implement emotion regulation and communication skills, partners within the context of relationship satisfaction might be more likely to successfully access and use effective response strategies in the face of increasing emotional arousal. Lloyd (1990), for instance, found that non-distressed/violent couples relied on negotiation as a conflict strategy more than distressed/violent couples—a finding that suggests satisfied partners might voice their concerns and temper impending hostility without engaging in destructive emotional escalation. Thus, relationship satisfaction might confer protective effects against the negative interactional styles that appear to be a risk factor for physical IPV among some couples.

Within this explanation, however, is an inherent complication: If non-distressed/IPV men appear to manage their emotions effectively, and thus potentially engage in fewer negative interactions with their partner, why do they at times remain physically violent in their relationships? Because couples in which both partners are relationally satisfied yet experience male-to-female IPV have been grossly understudied, the answer to this question is not entirely clear. However, given the limitations of observational studies on couple communication and other theoretical considerations on physical aggression perpetration, the possibilities are twofold.

First, as with many studies of couples' interactions, the trajectories of emotional arousal captured here may not have been representative of what always transpires between men and women in their natural environment (i.e., home). In non-laboratory settings, non-distressed/IPV men might indeed experience emotion dysregulation and a loss of emotional control similar to their distressed/IPV counterparts, and subsequently, retaliate with physical violence. However, within the laboratory, both partners might be more cognizant of their surroundings and,

therefore, more likely engage in skillful behavior. Thus, the patterns of arousal demonstrated in this study might indicate the ways in which non-distressed/IPV couples are *capable* of expressing and managing their emotions; it may not reflect the more aversive communication tactics they might normally use in everyday settings.

Second, while the diathesis-stress model proposed in this paper is a sensible approach to explain the emotional dynamics of IPV couples, it may be limited in scope. That is, there may be additional psychological processes that promote IPV between non-distressed partners. Namely, recent theoretical explanations of IPV have examined the construct of *self-regulation*, or an individual's tendency to act in accord with their momentary urges versus their long-term goals (Finkel, 2007; Finkel & Eckhardt, 2013). This work (known as "Instigation-Impellance-Inhibition" Theory, or I^3 Theory) suggests that both men and women may experience urges to aggress during conflict with their partner; these urges are neither pathological nor atypical. Rather, what determines whether these urges will manifest in experiences of IPV is the presence of *inhibitory* and *impellance* factors. According to Finkel (2007), *inhibitory* factors are dispositional or situational influences that increase the likelihood a person will override their urge to aggress (e.g., dispositional self-control, the presence of one's mother-in-law). *Impellance* factors, on the other hand, amplify violent tendencies (e.g., dispositional aggressiveness, acute physiological arousal from a source other than interpartner conflict). Although relationship satisfaction might be an inhibiting factor that decreases the likelihood an individual might act on aggressive urges, I^3 Theory suggests that some inhibitory factors have more salience (and thus more effectiveness) than others. This effectiveness depends not only on the strength of the inhibitory forces, but also on that of the impellance factors. Relationship satisfaction may therefore mitigate the likelihood of IPV perpetration for some, but not all, couples.

Indeed, unique combinations of other impellance and inhibiting factors may be influential in the occurrence of physical violence above and beyond the presence of relationship satisfaction. For instance, during conflict with their significant other, a partner who is emotionally aroused from an argument with their boss (*impellance* factor) might be more likely to aggress after coming home if they have low self-control (dis-*inhibiting* factor). Similarly, a partner who has witnessed IPV as a child and internalized the use of physical violence as a conflict tactic (*impellance* factor) might be more likely to behave violently toward their significant other during an argument while under the influence of alcohol (dis-*inhibiting* factor). Both are possibilities, even within the context of a healthy, satisfied relationship. Thus, individual differences in the dispositions, attitudes, and emotion regulation capacities of people who engage in IPV, along with their proximal cognitive, affective, and physiological experiences, might all play a central role in the perpetration of IPV in satisfied relationships. As such, in bringing together the present diathesis-stress model and I^3 Theory, it is clear these multiple perspectives are not mutually exclusive explanations for violent behavior in relationships. Rather, they acknowledge the prospect of *equifinality* within IPV—that different cognitive, emotional, and behavioral processes can lead to the same outcome of physical violence. Like the individuals who perpetrate IPV, the pathways that determine IPV are heterogeneous.

Emotional Arousal in Couples without IPV: *Distressed / Non-distressed Men and Women*

In addition to the above discussion on distressed and non-distressed/IPV couples, this investigation revealed noteworthy patterns of arousal among the remaining groups of couples without IPV (distressed and non-distressed). With respect to non-distressed/no-IPV partners, men and women demonstrated stable, flat trajectories of emotional arousal; that is, both partners

maintained their initial level of arousal across the conversation. This outcome is striking in light of other research on emotional expression in relationally satisfied, non-violent couples. Notably, Fischer et al. (2018) found that the emotional arousal of engaged/newlywed couples who participated in a relationship education program followed a U-shaped curve: They demonstrated steep decreases in arousal at the start of their conversation, then reversed course and increased in arousal by the end. Conversely, other investigations on the interactional styles of happy couples reflect a qualitatively different, *inverted*-U pattern; partners may experience some emotional escalation as they engage in conflict but de-escalate as the conversation continues (Gottman, Coan, Carrere, & Swanson, 1998). Collectively, these three distinct patterns—flat, U-shaped, and an inverted-U—suggest that satisfied couples might express and manage their emotions in different ways depending on the developmental stage of their relationship. For couples early in marriage, they might interact in ways to promote greater calmness as they engage in a conflict discussion, and later in the conversation, experience increases in arousal as their discussion of their relationship concerns becomes more substantive in nature (Fischer et al., 2018). However, after a number of years in their relationships, couples might find conflict less emotionally-provoking (i.e., flat trajectories), given they have found ways to effectively address a wide range of problems over the course of their relationship. Thus, the current findings add continuity to the field's nascent understanding of the ways in which couples approach emotional communication during different phases of relationship development and maintenance.

Similarly, the communication patterns exhibited by distressed/no-IPV couples supports previous work examining the trajectories of negative emotional arousal among distressed, treatment-seeking couples. Baucom et al. (2015b) found that during problem-solving conversations between distressed partners prior to couple therapy, emotional arousal increased

over the course of the interaction and then leveled-off at this higher arousal level by the end of the conversation, suggesting that distressed partners might have difficulties de-escalating their negative affective expression as conflict progresses. In the current study, distressed/no-IPV men and women demonstrated comparable patterns, mutually increasing in arousal across the conversation and decreasing marginally in arousal by the end. Although studies directly examining trajectories of emotional arousal are rare, it appears that our work adds substantively to the growing body of literature that uses measures of emotional arousal to understand a wide range of couple processes (e.g., Baucom et al., 2011; Weusthoff et al., 2013 Fischer et al., 2017; Weber et al., 2018). In conjunction with this previous work, the patterns exhibited here indicate a robust pattern of emotional reactivity between men and women in distressed relationships: Unlike distressed/IPV men and women who exhibit trajectories of arousal that are distinct from one another, both partners in distressed/no-IPV relationships exhibit similar patterns of emotional communication—a key difference in the ways in which partners within these two groups appear to interact during conflict.

Clinical Implications

Taken together, the preceding analysis suggests several possible entry-points for the treatment of IPV. Notably, two couple-based treatment modalities might be effective in reducing partner violence: (a) for distressed/IPV couples, conjoint couple therapy addressing both broader relationship distress and a more focused management of high levels of emotional arousal; and (b) for non-distressed/IPV couples, partner-assisted interventions focused on management of aggressive urges. Both approaches can be appropriately tailored to address the different emotional and psychological vulnerabilities of partners within each group.

With respect to conjoint therapy for distressed/IPV couples, there is increasing consensus in the field that couple-based interventions for partner aggression might be an effective tool to reduce the negative interactions that often precede IPV (Epstein, Werlinich, & LaTaillade, 2015; Stith, Rosen, McCollum, & Thomsen, 2004). Several iterations of such treatment programs exist and have demonstrated greater efficacy compared to traditional programs for men who engage in domestic violence (e.g., Physical Aggression Couples Treatment [PACT], Heyman & Neidig, 1997; Couples Abuse Prevention Program [CAPP], LaTaillade et al., 2006; Domestic Violence Focused Couples Treatment [DVFCT], Rosen, Matheson, Stith, McCollum, & Locke, 2003). Thus, couple therapy for IPV can be a safe and useful way to help couples who have a history of mild physical violence, are relationally distressed, and freely choose to stay together. Such interventions aim to accomplish a common set of objectives: (a) strengthen the couple's overall relationship; (b) increase each partner's awareness of violent behavior and its negative effects on individual and couple well-being; (c) decrease violent behavior; (d) increase use of effective emotion regulation skills; and (e) increase use of constructive skills for communication and conflict management (Epstein et al., 2015). Within these therapeutic aims, the dual goals of modifying partners' responses to each other and shifting the emotional atmosphere of the relationship are paramount. First, interventions to improve the general atmosphere of the relationship (including the enhancement of positive couple interactions) can have secondary effects on emotion regulation for partners in distressed/IPV relationships: Reducing the experience of couple distress may also shift the likelihood that the relationship climate serves as a broad risk factor for men's sensitivity to emotional arousal. Moreover, by improving partners' awareness and reactivity to emotions, a therapist can counteract the belief that negative emotions are aversive and erupt quickly without any warning signs. Therapists can effectively coach

partners to attend to bodily cues of emotional arousal, which can be used as signals to institute emotion regulation techniques (e.g., self-soothing) before conflict gets "out of hand."

Separately, with respect to non-distressed/IPV partners, partner-assisted interventions might hold promise in targeting behavioral urges to aggress. Traditionally, in the absence of relationship distress, couple-based interventions have not been recommended as a viable approach for individuals seeking treatment; if relationship distress is not the target of treatment per se, clinicians and researchers alike have argued that individually-based interventions should instead be pursued. However, recent research has demonstrated the utility of employing the couple as a primary modality of intervention for more focal individual concerns (e.g., psychopathology, medical problems; Fischer, Baucom, & Cohen, 2016). In such instances, interventions stemming from cognitive-behavioral orientations of couple therapy (Epstein & Baucom, 2002; Baucom et al., 2020) have been integrated with current knowledge about what is needed to help an individual address a specific issue. As such, partner-assisted approaches draw on the direct involvement of the partner to help employ strategies that target the behavior of concern (e.g., behavioral activation for depression). In doing so, both partners—each of whom is substantially involved in treatment—learn about the ways in which individual psychological difficulties operate within an interpersonal context. Thus, for satisfied couples who experience IPV in their relationship, relying on such interventions can instruct each partner (a) on the factors related to maladaptive, emotion-driven behavior and (b) how to jointly enact techniques that mitigate the degree to which an individual acts on their violent urges. Although additional research needs to be conducted on the specific techniques that might be optimal to address IPV within this partner-assisted context, this treatment modality might be a valuable avenue for

individuals who struggle to develop non-violent responses to their cognitive and emotional experiences.

Limitations and Strengths

In considering the above findings and their accompanying interpretations, limitations of this study must be taken into account. First, although the interpretations of the findings involve assumptions about the communication behavior and emotion regulation strategies associated with couples' trajectories of arousal, definitive conclusions cannot be drawn about the content of specific behaviors emitted during couple conversations based upon these results. Given the data available (i.e., vocal fundamental frequency), we cannot confirm whether decreases in arousal were associated with withdrawal (for distressed/IPV women) or effective emotion regulation (for non-distressed/IPV partners), and whether mutual increases in arousal may have been in part due to negative reciprocity involving negative comments between partners. Thus, our interpretations of the data should be considered preliminary; future research should rely on integrating various measurement methods to explore the association between changes in arousal, partner behavior (via observational coding), and attempts at emotion regulation (via self-report).

Second, it is important to realize that physically violent behavior was not occurring during the conversations; instead, the sample includes couples in which the male has been violent at some point during the past year. Therefore, we cannot conclude that the patterns of emotional arousal demonstrated during these conversations are the key determinants of violent behavior per se. That said, the findings for distressed/IPV males are consistent with the reports of some males who become violent after (a) their emotional arousal mounts during interactions with their partner and (b) they struggle to de-escalate emotionally.

In addition, because the CTS-2 selection criteria for IPV focused on male-to-female violence, our analyses for the IPV groups preclude us from extending our interpretation of the findings to female-to-male violence. Whereas bidirectional violence was present in our current sample to some extent (see "Results" section for further description), female violence was not included as a variable in our analyses due to (a) the predetermined nature of the 2x2 study design and (b) our sample size (which is not adequate enough to evaluate the effects of both male and female violence simultaneously). Thus, it is possible that the patterns of emotional arousal represented here are characteristic of couples who engage in bidirectional, situational violence, and not only of couples who experience violent behavior from male partners. Future research should therefore evaluate the extent to which changes in arousal differ when one versus both partners exhibit violence in the relationship. Finally, given that the couples in this investigation were primarily middle-aged, married or living together for an average of 12 to 13 years, and experienced mild forms of IPV, the current results may not generalize to (a) younger couples in earlier stages of their relationship or (b) clinical samples of couples who engage in severe, coercive forms of violence.

Despite these limitations, this study contributes to the literature on relationship functioning in a number of ways. Namely, using novel methodology (e.g., fundamental frequency), this study addresses an important gap in the literature regarding changes in emotional expression between partners with and without relationship distress and histories of physical IPV. Whereas other investigations confound relationship distress with IPV (e.g., Holtzworth-Munroe, Smutzler, & Stuart, 1998) and have used static measures of emotion to draw dynamic conclusions about couples' interactions (e.g., Eckhardt, Murphy, & Samper, 2008), the present work examines various combinations of distress and IPV while using a continuous objective

measure of emotional arousal. Thus, not only does this study add to the mounting evidence for fundamental frequency as a robust measure of emotional arousal; it also points to potential interpersonal mechanisms through which distressed and satisfied partners might engage in problematic communication and experience male-to-female IPV. Furthermore, most previous investigations of couple communication within the context of IPV have focused on relationships with moderate-to-severe forms of physical battery between husbands and wives (e.g., Cordova et al., 1993; Jacobson et al., 1994). However, severe violence characterizes a small portion of the types of violence couples experience (Kelly & Johnson, 2008). Therefore, the current focus on couples with IPV exhibiting *mild* forms of violence is important. In doing so, our work extends previous research by focusing centrally on couples with experiences of violence that are much more prevalent in community samples (Kelly & Johnson, 2008; Williams & Frieze, 2005) and who might seek couple therapy for their relationship problems (Salis & O'Leary, 2016).

Conclusion

In conclusion, we return to the original question posed at the outset of this paper: If distressed couples do not always communicate in ways that are behaviorally distinct from distressed/violent couples, how can we explain *why* certain interactions do or do not result in IPV? Based on the current findings, we have reiterated there is no single reason why IPV occurs. More specifically, despite the general agreement that relationship discord and poor communication are risk factors for IPV, the relationship context alone may not be enough to determine violent behavior. Rather, different patterns of negative emotional arousal among couples experiencing IPV suggest the relationship climate might interact with other individual factors (e.g., male partners' exaggerated sensitivity to emotional arousal) to increase IPV risk. Our understanding of the ways in which these factors combine to precipitate episodes of violence

will be improved by continuing to build theoretical models of IPV that strive for coherence among risk factors. Using the information from this investigation, it is our hope that researchers will continue to consider the interpersonal dynamics of IPV as a central feature of these models, contributing to the development of clinical tools necessary to reduce destructive communication and bolster healthy relationship functioning.

Table 1.
Men's Demographic Characteristics

Variable	Group			
	ND/NV (*N* = 40)	D/NV (*N* = 40)	D/V (*N* = 40)	ND/V (*N* = 29)
Age (years)				
M (SD)	42.30 (10.70)	43.90 (9.45)	43.93 (11.36)	40.03 (9.98)
Years of Education				
M (SD)	15.06 (2.53)	13.99 (2.14)	13.45 (2.40)	15.05 (2.91)
Employment Status (% [*N*])				
Part-Time	7.5% (3)	75.% (3)	2.5% (1)	3.4% (1)
Full-Time	70.0% (28)	80.0% (32)	75.0% (30)	86.2% (25)
Student	2.5% (1)	--	--	--
Unemployed/Disabled	15.0% (6)	12.5% (5)	20.0% (8)	6.9% (2)
Ethnicity[a] (% [*N*])				
African-American	2.5% (1)	7.5% (3)	5.0% (2)	3.4% (1)
Asian	--	--	--	3.4% (1)
Caribbean-American	--	2.5% (1)	--	--
Latino or Hispanic	2.5% (1)	5.0% (2)	10.0% (4)	10.3% (3)
Native American	2.5% (1)	5.0% (2)	7.5% (3)	3.4% (1)
White	95.0% (38)	82.5% (33)	80.0% (32)	79.3% (23)
Marital Status (% [*N*])				
Married	95.0% (38)	90.0% (36)	90.0% (36)	96.6% (28)
Living Together	5.0% (2)	10.0% (4)	10.0% (4)	3.4% (1)
QMI Score				
M (SD)	40.73 (4.26)	23.41 (6.22)	21.71 (6.68)	37.52 (4.26)

Note. (a) Because multiple ethnic identities were selected by some respondents, percentages add to more than 100%. ND/NV = non-distressed/no-IPV; D/NV = distressed/no-IPV; D/V = distressed/IPV; ND/V = non-distressed/IPV; QMI = Quality of Marriage Index.

Table 2.
Women's Demographic Characteristics

Variable	Group			
	ND/NV (*N* = 40)	D/NV (*N* = 40)	D/V (*N* = 40)	ND/V (*N* = 29)
Age (years)				
M (SD)	40.95 (11.38)	42.43 (8.16)	40.73 (11.06)	37.72 (9.52)
Years of Education				
M (SD)	15.03 (2.38)	14.06 (2.30)	13.46 (1.67)	14.38 (2.40)
Employment Status (% [*N*])				
Part-Time	12.5% (5)	22.5% (9)	27.55% (11)	20.7% (6)
Full-Time	52.5% (21)	55.0% (22)	40.0% (16)	44.8% (13)
Student	5.0% (2)	--	--	--
Unemployed/Disabled	27.5% (11)	15.0% (6)	32.5% (13)	34.4% (10)
Ethnicity[a] (% [*N*])				
African-American	2.5% (1)	7.5% (3)	5.0% (2)	3.4% (1)
Asian	--	--	2.5% (1)	3.4% (1)
Caribbean-American	--	--	2.5% (1)	--
Latino or Hispanic	2.5% (1)	10.0% (4)	--	6.9% (2)
Native American	--	2.5% (1)	5.0% (2)	--
White	97.5% (39)	82.5% (33)	95.0% (38)	86.2% (25)
Marital Status (% [*N*])				
Married	95.0% (38)	90.0% (36)	90.0% (36)	96.6% (28)
Living Together	5.0% (2)	10.0% (4)	10.0% (4)	3.4% (1)
QMI Score				
M (SD)	40.88 (4.37)	21.08 (6.33)	18.17 (7.58)	38.16 (4.08)

Note. (a) Because multiple ethnic identities were selected by some respondents, percentages add to more than 100%. ND/NV = non-distressed/no-IPV; D/NV = distressed/no-IPV; D/V = distressed/IPV; ND/V = non-distressed/IPV; QMI = Quality of Marriage Index.

Table 3.
Partners' Combined Report for Family Variables

Variable	Group							
	ND/NV (*N* = 40)		D/NV (*N* = 40)		D/V (*N* = 40)		ND/V (*N* = 29)	
	M (SD)	Range	*M (SD)*	Range	*M (SD)*	Range	*M (SD)*	Range
Length of Marriage/Yrs Living Together	12.34 (11.50)	1-51	12.13 (7.41)	<1-32	13.91 (12.96)	<1-52	12.46 (11.10)	1-44
Annual Household Income[a]	$81,000	$7,000-$430,000	$78,500	$25,000-205,000	$65,750	$8,000-280,000	$88,250	$25,000-215,000
Number of kids	1.90 (2.00)	0-6	2.75 (1.71)	1-6	2.63 (2.00)	0-6	1.93 (1.69)	0-6

Note. (a) Median household income is reported. ND/NV = non-distressed/no-IPV; D/NV = distressed/no-IPV; D/V= distressed/IPV; ND/V = non-distressed/IPV; QMI = Quality of Marriage Index.

Table 4.
Overall Group Differences on Demographic Variables for Men, Women, and Combined Report

Variable	*MS* Between-Within	*F*	*p*
Men[a]			
Age	(109.99, 108.81)	1.01	.39
Years of Education	**(24.08, 6.13)**	**3.93**	**.01**
QMI Score	**(3,568.25, 30.79)**	**115.89**	**>.001**
Women[a]			
Age	(126.03, 102.10)	1.22	.30
Years of Education	**(16.69, 4.82)**	**3.47**	**.02**
QMI Score	**(5,092.11, 34.59)**	**147.23**	**>.001**
Combined Report[a]			
Length of Marriage/Yrs Living Together	(26.17, 119.71)	0.25	.86
Annual Household Income	(1,708,656,020.17, 2,698,915,570.28)	0.62	.60
Number of Children	**(7.26, 2.51)**	**2.99**	**.03**
CTS-2 Sub-scales (M-F)[b]			
Mild Physical	**(439.59, 8.69)**	**50.16**	**>.001**
Severe Physical	**(33.98, 2.76)**	**12.22**	**>.001**
Mild Psychological	**(704.41, 24.25)**	**29.08**	**>.001**
Severe Psychological	**(197.64, 9.39)**	**21.05**	**>.001**

Note. (a) *df* = (3, 145) or (3, 144) for all variables. (b) CTS-2 scores represent the average number of acts of aggression reported between both partners, including those experienced within the past year and ever in the history of their relationship.

CTS-2 = Revised Conflict Tactics Scales; M-F = male-to-female aggression.

Table 5.
Post-Hoc Group Differences on Demographic Variables for Men, Women, and Combined Report[a]

Variable	Comparisons					
	ND/NV—D/NV	ND/NV—D/V	ND/NV—ND/V	D/NV—D/V	D/NV—ND/V	D/V—ND/V
Men						
Age	-1.60 (2.33)	-1.62 (2.33)	2.27 (2.54)	-0.025 (2.33)	3.87 (2.54)	3.89 (2.54)
Years of Education	1.08 (0.55)	**1.61 (0.55)***	0.01 (0.60)	0.54 (0.55)	-1.06 (0.60)	**1.60 (0.60)***
QMI Score	**17.31 (1.24)****	**19.01 (1.24)****	3.21 (1.35)	1.70 (1.24)	**-14.10 (1.35)****	**-15.81 (1.35)****
Women						
Age	-1.48 (2.27)	0.23 (2.27)	3.23 (2.48)	1.70 (2.27)	4.70 (2.48)	3.00 (2.48)
Years of Education	0.96 (0.49)	**1.56 (0.49)***	0.65 (0.54)	0.60 (0.49)	-0.32 (0.54)	-0.92 (0.54)
QMI Score	**19.80 (1.32)****	**22.71 (1.32)****	2.72 (1.43)	2.91 (1.32)	**-17.08 (1.43)****	**-19.99 (1.43)****
Combined Report						
Length of Marriage/Yrs Living Together	0.21 (2.46)	-1.58 (2.45)	-0.12 (2.67)	-1.79 (2.46)	-0.33 (2.68)	1.46 (2.67)
Annual Household Income	7,368.45 (11,616.61)	11,058.50 (11,616.61)	-4,538.57 (12,800.89)	3,690.05 (11,616.61)	-11,907.02 (12,800.89)	-15,597.07 (12,800.89)
Number of Children	-0.85 (0.35)	-0.73 (0.35)	-0.07 (0.39)	0.13 (0.35)	0.78 (0.39)	0.66 (0.39)

CTS-2 Sub-scales (M-F)						
Mild Physical	-0.13 (0.66)	**-6.98 (0.66)****	**-3.74 (-0.72)****	**-6.86 (0.66)****	**-3.62 (0.72)****	**3.23 (0.72)****
Severe Physical	0.00 (0.37)	**-1.93 (0.37)****	-0.28 (0.41)	**-1.93 (0.37)****	-0.28 (0.41)	1.65 (0.41)
Mild Psychological	**-6.03 (1.10)****	**-10.23 (1.10)****	**-5.44 (1.20)****	**-4.20 (1.10)****	0.59 (1.20)	**4.79 (1.20)****
Severe Psychological	**-1.95 (0.69)***	**-5.33 (0.69)****	-1.7 (0.75)	**-3.38 (0.69)****	0.35 (0.75)	**3.63 (0.69)****

Note. (a) Mean differences and standard errors are presented for each group comparison. ND/NV = non-distressed/no-IPV; D/NV = distressed/no-IPV; D/V = distressed/IPV; ND/V = non-distressed/IPV; QMI = Quality of Marriage Index.
*$p < .05$; **$p \leq .001$.

Table 6.
Levels of Physical Violence Among Men and Women.

Variable		Group			
		ND/NV (N = 80[a])	D/NV (N = 80)	D/V (N = 80)	ND/V (N = 58)
CTS-2 Subscales	*Number of Acts*[b]	*Percentage (N)*			
Male-to-Female Violence					
Mild Physical	0	95.0% (76)	82.5% (66)	--	--
	1-3	5.0% (4)	17.5% (14)	27.5% (22)	65.5% (38)
	4-6	--	--	30% (24)	24.0% (14)
	7+	--	--	42.5% (34)	10.2% (6)
Severe Physical	0	100% (80)	100% (80)	47.5% (38)	84.5% (49)
	1-3	--	--	35.0% (28)	15.5% (9)
	4-6	--	--	12.5% (10)	--
	7+	--	--	5.0% (4)	--
Female-to-Male Violence					
Mild Physical	0	90.0% (72)	62.5% (50)	2.5% (2)	24.1% (14)
	1-3	10.0% (8)	25.0% (20)	27.5% (22)	37.9% (22)
	4-6	--	5.0% (4)	22.5% (18)	17.1% (10)
	7+	--	7.5% (6)	47.5% (38)	20.5% (12)
Severe Physical	0	100% (80)	80.0% (64)	50.0% (40)	72.4% (42)
	1-3	--	15.0% (12)	35.0% (28)	24.1% (14)
	4-6	--	5.0% (4)	5.0% (4)	3.4% (2)
	7+	--	--	10.0% (8)	--

Note. (a) Given that both partners within each group reported on the occurrence of male-to-female and female-to-male violence, *N* represents the total number of respondents (men + women). (b) Acts of aggression include those experienced within the past year and ever in the history of their relationship. CTS-2 = Revised Conflict Tactics Scales. ND/NV = non-distressed/no-IPV; D/NV = distressed/no-IPV; D/V = distressed/IPV; ND/V = non-distressed/IPV.

Table 7.
Aggregate Levels of Mean f_0 across Conversations.

		Men	Women	Total
Group	***N***	Mean (*SD*)	Mean (*SD*)	Mean (*SD*)
ND/NV	40	121.81 (16.74)	179.67 (18.93)	150.86 (33.99)
D/NV	40	124.59 (19.74)	183.08 (19.28)	153.96 (35.08)
D/V	40	123.45 (18.67)	185.13 (19.73)	154.79 (36.26)
ND/V	29	128.75 (20.55)	183.33 (13.60)	156.81 (32.44)

Note. ND/NV = non-distressed/no-IPV; D/NV = distressed/no-IPV;
D/V = distressed/IPV; ND/V = non-distressed/IPV;
QMI = Quality of Marriage Index.

Table 8.
Estimated Coefficients for Growth Curves Examining Trajectories of Mean f_0 by Partner.

	Women							
	ND/NV		D/NV		D/V		ND/V	
Variable	*B*	*SE B*	*B*	*SE B*	*B*	*SE B*	*B*	*SE B*
Intercept	**185.48*** **	3.22	**179.99*** **	2.87	**184.45*** **	3.04	**181.54*** **	2.67
Conversation Topic	1.11	0.79	0.21	0.98	**3.39*** **	0.82	0.35	1.04
Time	-0.62	0.52	**2.80*** **	0.64	**2.01*** **	0.56	**2.37*** **	0.71
Time^2	0.06	0.05	**-0.21*** **	0.06	**-0.22*** **	0.05	**-0.22** **	0.07
	Men							
	ND/NV		D/NV		D/V		ND/V	
	B	*SE B*	*B*	*SE B*	*B*	*SE B*	*B*	*SE B*
Intercept	**124.25*** **	2.80	**119.71*** **	3.24	**124.51*** **	3.36	**128.85*** **	3.91
Conversation Topic	-0.90	0.79	0.99	0.98	-0.69	0.83	**3.21** **	1.04
Time	0.50	0.52	**2.97*** **	0.64	**1.27***	0.56	**1.63***	0.71
Time^2	-0.04	0.05	**-0.16***	0.06	-0.06	0.05	**-0.18***	0.07

Note. ND/NV = non-distressed/no-IPV; D/NV = distressed/no-IPV; D/V = distressed/IPV; ND/V = non-distressed/IPV.
***$p < .001$, ** $p < .01$, * $p < .05$.

Table 9.
Main Effects and Interactions Between Relationship Distress, IPV, and Partner Sex on Trajectories of Mean f_0.

Effect	*B*	*SE B*	*t*	*p*
Intercept	**154.43*** **	**2.33**	**66.16**	**<.0001**
Conversation Topic	**0.91****	**0.32**	**2.87**	**0.004**
Time	-0.07	0.38	-0.18	0.860
Time^2	0.01	0.04	0.28	0.781
Partner	**62.34*** **	**3.70**	**16.85**	**<.0001**
Time*Partner	-1.12	0.76	-1.48	0.139
Time^2*Partner	0.10	0.07	1.30	0.194
IPV	1.18	3.62	0.32	0.746
Time*IPV	**2.09*** **	**0.61**	**3.40**	**0.0007**
Time^2*IPV	**-0.21*** **	**0.06**	**-3.51**	**0.0004**
Relationship Distress	-4.67	3.34	-1.40	0.164
Time* Relationship Distress	**2.95*** **	**0.58**	**5.06**	**<.0001**
Time^2* Relationship Distress	**-0.19*** **	**0.06**	**-3.41**	**0.0007**
IPV* Relationship Distress	3.78	4.94	0.77	0.445
Time*IPV* Relationship Distress	**-3.35*** **	**0.86**	**-3.91**	**<.0001**
Time^2*IPV* Relationship Distress	**0.25***	**0.08**	**3.02**	**0.0025**
Partner* Relationship Distress	-2.33	5.34	-0.44	0.6630
Time*Partner*Relationship Distress	0.95	1.17	0.82	0.4144
Time^2*Partner* Relationship Distress	-0.14	0.11	-1.25	0.2102
Partner*IPV	-11.21	5.79	-1.94	0.0528
Time*Partner*IPV	1.83	1.23	1.49	0.1361
Time^2*Partner*IPV	-0.14	0.12	-1.15	0.2500
Partner*IPV* Relationship Distress	13.07	7.90	1.65	0.0981
Time*Partner*IPV*Relationship Distress	-0.92	1.71	-0.54	0.5926

Effect	*B*	*SE B*	*t*	*p*
Time^2*Partner*IPV* Relationship Distress	0.03	0.17	0.16	0.8741

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

Table 10.
Examining the Combined Effect of Time on Differences in Mean f_0 Trajectories Within and Between Groups.

Comparisons	*F*	*p*
Men vs. Women (within)		
ND/NV	0.92	0.3978
D/NV	**3.22***	**0.0399**
D/V	**10.11*****	**<.0001**
ND/V	0.82	0.4416
Men between groups		
ND/NV – D/NV	**19.02*****	**<.0001**
ND/NV – D/V	**4.30***	**0.0136**
ND/NV – ND/V	1.85	0.1569
D/NV – D/V	**5.58****	**0.0038**
D/NV – ND/V	**17.78*****	**<.0001**
D/V – ND/V	**6.17****	**0.0021**
Women between groups		
ND/NV – D/NV	**12.85*****	**<.0001**
ND/NV – D/V	**6.09****	**0.0023**
ND/NV – ND/V	**6.10****	**0.0023**
D/NV – D/V	**10.08*****	**<.0001**
D/NV – ND/V	2.96	0.0517
D/V – ND/V	1.47	0.2300

Note. (a) *df* = (2, 10,647) for all comparisons; (b) ND/NV = non-distressed/no-IPV; D/NV = distressed/no-IPV; D/V = distressed/IPV; ND/V = non-distressed/IPV.
***$p < .001$, ** $p < .01$, * $p < .05$

Table 11.
Examining Differences in Intercept, Linear, and Quadratic Estimates Within Groups.

Men vs. Women		*B*	*SE B*	*t*	*p*
ND/NV	Intercept	**-60.72*** **	**3.06**	**-19.84**	**<.0001**
	Linear	0.94	0.81	1.16	0.2441
	Quadratic	-0.074	0.08	-0.95	0.3430
D/NV	Intercept	**-61.66*** **	**3.02**	**-20.42**	**<.0001**
	Linear	0.52	0.82	0.63	0.5286
	Quadratic	0.002	0.08	0.03	0.9784
D/V	Intercept	**-61.87*** **	**3.74**	**-16.54**	**<.0001**
	Linear	-0.74	0.80	-0.93	0.3509
	Quadratic	**0.16***	**0.08**	**2.02**	**0.0431**
ND/V	Intercept	**-51.13*** **	**4.45**	**-11.49**	**<.0001**
	Linear	-0.70	0.96	-0.73	0.4650
	Quadratic	0.04	0.093	0.44	0.6611

Note. (a) *df* = (10,647) for all comparisons; (b) ND/NV = non-distressed/no-IPV; D/NV = distressed/no-IPV; D/V = distressed/IPV; ND/V = non-distressed/IPV.
***$p < .001$, ** $p < .01$, * $p < .05$.

Table 12.
Examining Differences in Intercept, Linear, and Quadratic Estimates Between Groups (Men Only).

Comparisons		*B*	*SE B*	*t*	*p*
ND/NV – D/NV	Intercept	**7.13*** **	**2.09**	**3.41**	**0.0006**
	Linear	**-2.59** **	**0.81**	**-3.19**	**0.0014**
	Quadratic	0.14	0.079	1.73	0.0841
ND/NV – D/V	Intercept	1.80	3.83	0.47	0.6382
	Linear	-0.10	0.80	-1.24	0.2144
	Quadratic	0.04	0.078	0.52	0.6011
ND/NV – ND/V	Intercept	-4.47	4.28	-1.04	0.2970
	Linear	-1.41	0.89	-1.58	0.1133
	Quadratic	0.16	0.09	1.81	0.0702
D/NV – D/V	Intercept	-5.32	3.81	-1.40	0.1627
	Linear	**1.60***	**0.81**	**1.98**	**0.0483**
	Quadratic	-0.10	0.08	-1.22	0.2237
D/NV – ND/V	Intercept	**-11.59** **	**4.24**	**-2.72**	**0.0066**
	Linear	1.19	0.90	1.32	0.1860
	Quadratic	0.02	0.08	0.22	0.8271
D/V – ND/V	Intercept	-6.27	4.65	-1.35	0.1777
	Linear	-0.41	0.89	-0.47	0.6407
	Quadratic	0.12	0.09	1.34	0.1798

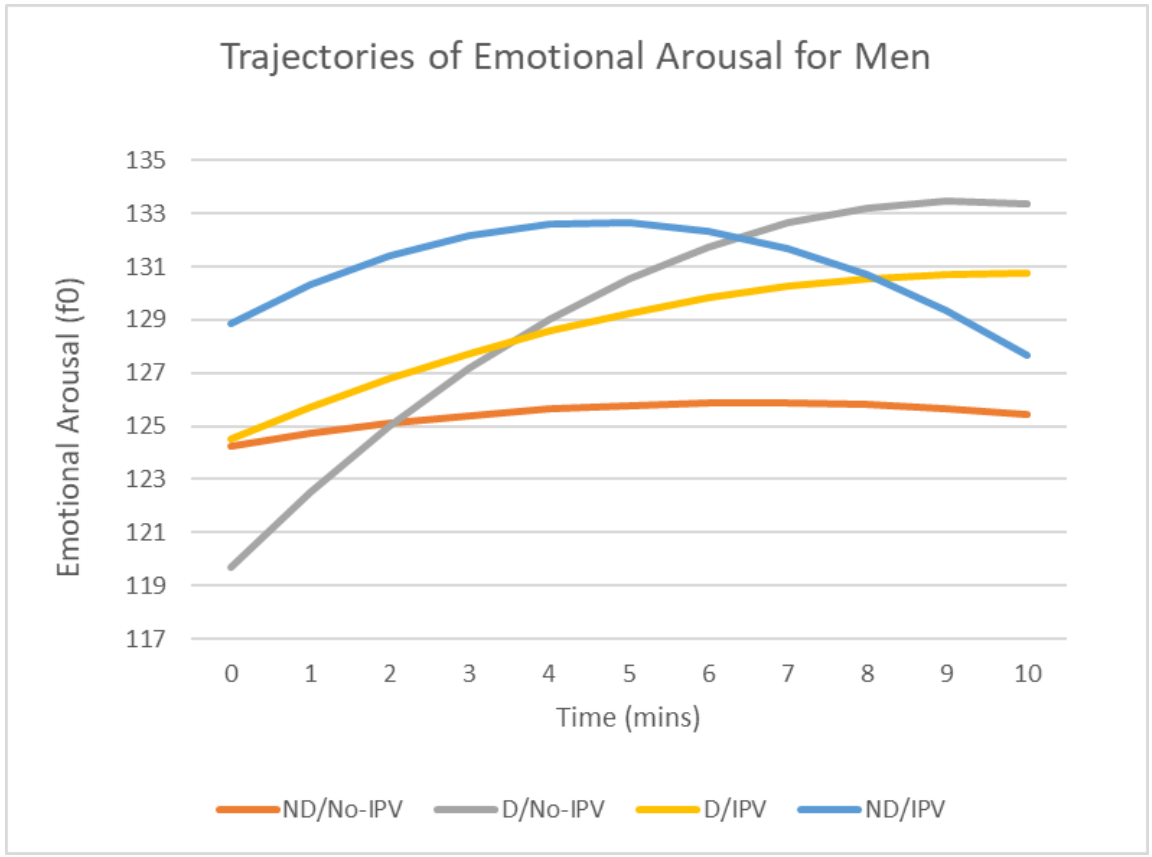
Note. (a) *df* = (10,647) for all comparisons; (b) ND/NV = non-distressed/no-IPV; D/NV = distressed/no-IPV; D/V = distressed/IPV; ND/V = non-distressed/IPV.
***$p < .001$, ** $p < .01$, * $p < .05$

Table 13.
Examining Differences in Intercept, Linear, and Quadratic Estimates Between Groups (Women Only).

Comparisons		*B*	*SE B*	*t*	*p*
ND/NV – D/NV	Intercept	**6.18****	**2.09**	**2.96**	**0.0031**
	Linear	**-3.02*****	**0.82**	**-3.70**	**0.0002**
	Quadratic	**0.21****	**0.08**	**2.69**	**0.0072**
ND/NV – D/V	Intercept	0.66	3.83	0.17	0.8641
	Linear	**-2.68*****	**0.80**	**-3.34**	**0.0008**
	Quadratic	**0.27*****	**0.08**	**3.49**	**0.0005**
ND/NV – ND/V	Intercept	5.13	4.28	1.20	0.2311
	Linear	**-3.06*****	**0.89**	**-3.43**	**0.0006**
	Quadratic	**0.27****	**0.09**	**3.15**	**0.0016**
D/NV – D/V	Intercept	-5.53	3.81	-1.45	0.1471
	Linear	0.34	0.81	0.42	0.6756
	Quadratic	0.06	0.08	0.74	0.4571
D/NV – ND/V	Intercept	-1.05	4.27	-0.25	0.8048
	Linear	-0.04	0.90	-0.04	0.9668
	Quadratic	0.06	0.09	0.66	0.5066
D/V – ND/V	Intercept	4.47	4.65	0.96	0.3359
	Linear	-0.38	0.88	-0.43	0.6707
	Quadratic	-0.001	0.09	-0.01	0.9902

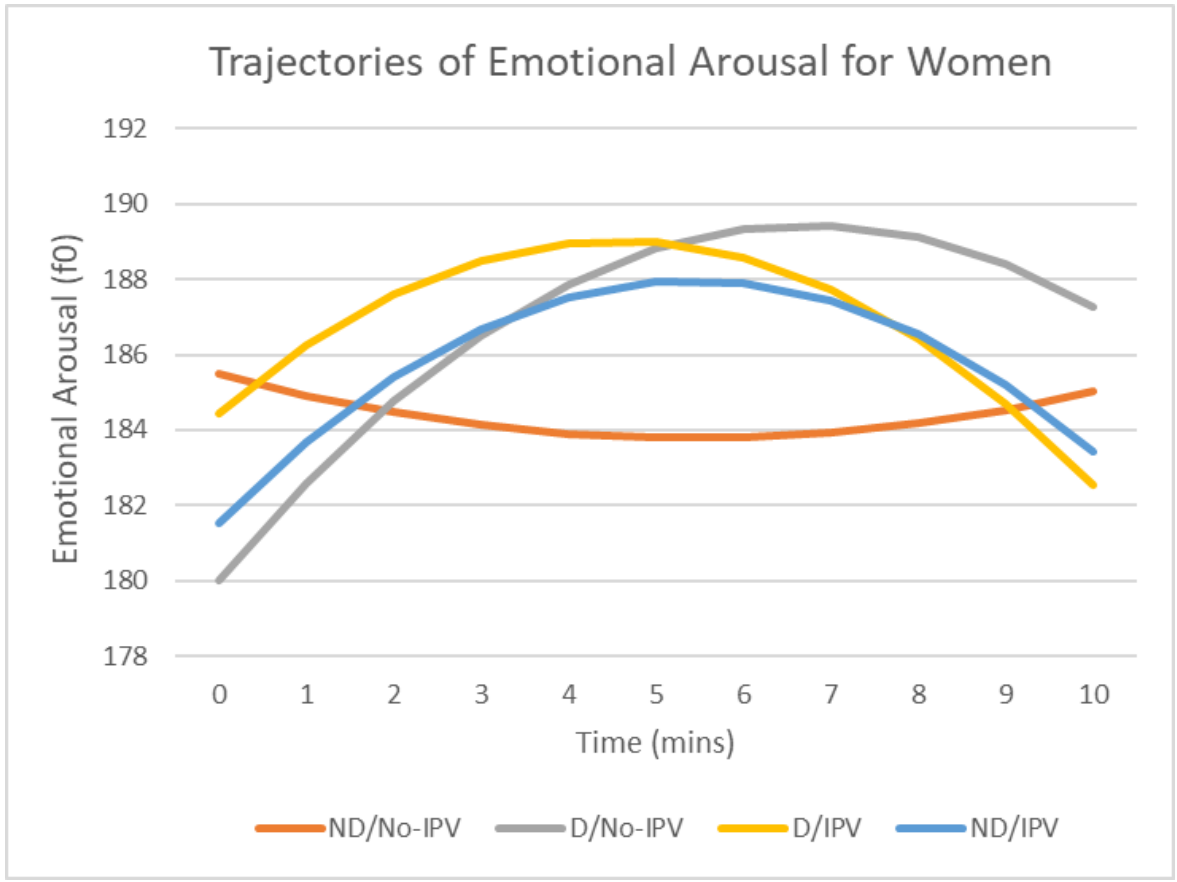
Note. (a) *df* = (10,647) for all comparisons; (b) ND/NV = non-distressed/no-IPV; D/NV = distressed/no-IPV; D/V = distressed/IPV; ND/V = non-distressed/IPV.
****p* < .001, ** *p* < .01, * *p* < .05

Figure 1.
Plots of partner-level growth curves for men (separated by group).



Note. ND/NV = non-distressed/no-IPV; D/NV = distressed/no-IPV; D/V = distressed/IPV; ND/V = non-distressed/IPV.

Figure 2.
Plots of partner-level growth curves for women (separated by group).



Note. ND/NV = non-distressed/no-IPV; D/NV = distressed/no-IPV; D/V = distressed/IPV; ND/V = non-distressed/IPV.

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