A profile of violence in rural Niger: characteristics of men who perpetrate IPV in rural Niger

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Abstract

In this study we use data collected from 966 men in rural Niger and their adolescent wives in order to understand the characteristics of men who have perpetrated intimate partner violence. We find that there are clusters of characteristics that are associated with a higher likelihood of perpetrating violence, including experiencing parental violence, negative affect, and believing the community supports IPV. Experiencing parental violence itself is strongly associated with gender inequitable norms and attitudes, norms and attitudes supporting IPV, and higher levels of negative affect. Men who comprise clusters with low rates of violence are also those whose wives engage in agricultural work. These characteristics also cluster in geographically proximal villages. Our results suggest that violence is part of a complex nexus of related characteristics that may be normatively driven. Intervention efforts that don't address this social and psychological complexity may be less effective.

INTRODUCTION:

Across the world, one in three women has experienced intimate partner violence (IPV) (Devries et al., 2013; UNWOMEN, 2011; World Health Organization, 2013). In West Africa – the region where Niger is located and the focus of this study – the estimated prevalence of women who have experienced IPV in their lifetime is over 40%, one of the highest proportions of any region in the world.

Intimate partner violence (IPV) against women is a public health problem as well as a human rights violation; IPV is associated with multiple poor psychological and physical health outcomes for women and can sometimes result in death (Campbell, 2002; García-Moreno & Stöckl, 2013). Women who experience IPV give birth to children who are more likely to experience respiratory and diarrheal illnesses, malnutrition, and neonatal or infant death. (Koenig et al., 2010; Rico, Fenn, Abramsky, & Watts, 2011; Silverman et al., 2009). Children with a mother who experiences IPV are also more likely to suffer from a range of mental health issues (Wathen & MacMillan, 2013). Despite the high prevalence of IPV in western Africa, there is limited research on the factors that contribute to men's perpetration of violence against their female partners in the region (Devries et al., 2013).

IPV is related to risk factors at many different levels, including those at the individual and community levels (World Health Organization, 2013). Although many community level factors - such as gender inequity, economic variation, and patriarchal family structures - are linked to IPV perpetration, all men in IPV-enabling environments do not perpetrate IPV. This variation in men's perpetration of IPV indicates that individual factors, such as attitudes towards IPV, exposure to family violence, and mental health can also influence IPV perpetration (Fonseka, Minnis, & Gomez, 2015; World Health Organization, 2013). (1). Prior cross-sectional

research in multiple countries suggests that both men's and women's attitudes towards IPV are predictive of women's reported IPV experience, although this can vary greatly by context (2, 3). In general, women who have experienced IPV are also more likely to report attitudes accepting of it (4-7). In a large cross-sectional study looking at these associations within different countries, both men's and women's attitudes, when included in the same models continued to each predict women's reported experience of IPV, suggesting that each acts independently of the other regarding their association with IPV experiences (2). While most studies have found that men who perpetrate IPV tend to report attitudes accepting of IPV (2), some research has failed to find such an association (8).

Though there are many studies of associations between men's and women's attitudes towards IPV and women's experience of IPV, far fewer have clarified the role of social norms (9). This is likely due, in part, to current lack of shared understanding of the nature of social norms (vs. individual attitudes) and how they should be measured (10). Linos and Kawachi (2012) called for considering norms in IPV research, but the two papers they cite as examples (11, 12) measure social norms by aggregating individual attitudes. Equating social norms and the sum of people's individual attitudes is not universally accepted in the literature, and distinct measures for both norms and attitudes can help differentiate important motivations for perpetrating IPV.

Attitudes and norms in support of IPV can be seen as a broader range within attitudinal and social normative contexts that promote gender inequity. While attitudes and norms promoting IPV are behaviorally specific, attitudes and norms promoting gender inequity are reflective of an underlying cultural model of what is and what is not acceptable for men and women in given situations, with an underlying social hierarchy that favors male power and

superiority in most situations. In such contexts, IPV is often considered an acceptable consequence of normative violations committed by women and enforced by men.

While norms and attitudes may be relevant motivators for men who perpetrate IPV, previous studies have shown that men who experienced physical abuse in childhood are more likely to perpetrate IPV in adulthood. The World Health Organization (WHO) defined childhood physical abuse as acts by a caregiver "that cause actual physical harm or have the potential for harm" (Krug, Mercy, Dahlberg, & Zwi, 2002). Multiple studies in the United States and other high-income countries have supported this link between experiencing childhood abuse and IPV perpetration in adulthood (Fang & Corso, 2007; McKinney, Caetano, Ramisetty-Mikler, & Nelson, 2009). Similarly, research in southeast Asia and East and Southern Africa have had similar findings (Fonseka et al., 2015; Fulu, Jewkes, Roselli, & Garcia-Moreno, 2013) (Abrahams, Jewkes, Hoffman, & Laubsher, 2004; Maman, Yamanis, Kouyoumdjian, Watt, & Mbwambo, 2010). However, research conducted in West Africa – a setting with unique cultural and familial traditions and colonial legacy – has yet to examine this relationship.

Another individual-level factor that has been hypothesized to increase risk of IPV perpetration is the presence of depressive symptoms, or negative affect. Negative affect as a risk factor for IPV has not been studied as extensively as childhood abuse, and findings are currently limited to specific populations within high-income English-speaking countries. Studies conducted among US military servicemen and veterans have linked depressive symptoms to higher rates of IPV perpetration, and shown greater depression severity to be associated with higher frequency of IPV perpetration (Marshall, Panuzio, & Taft, 2005; Sherman, Sautter, Jackson, Lyons, & Han, 2006). A systematic review of IPV risk factors in the US, Canada, UK, New Zealand, and Australia found mixed results on the association between IPV perpetration

and depressive symptoms (Capaldi et al. 2012). Finally, a 2015 meta-analysis of North American studies found internalizing negative emotions to be moderately associated with IPV perpetration. Outside of high-income English-speaking countries, the literature on IPV perpetration and negative affect is very sparse, although a study in South Africa found a link between depressive symptoms and IPV perpetration among young men (Nduna, Jewkes, Dunkle, Shai, & Colman, 2010).There is a strong need for more research on the relationship between IPV perpetration and depressive symptoms in low- and middle-income countries generally, and in western Africa specifically.

While community-level and individual-level factors for IPV perpetration have received more attention, researchers are beginning to test how geographic factors influence the likelihood of IPV perpetration, above and beyond those specific to distinct communities. Spatial analyses can of course identify which communities have higher rates of an outcome such as IPV, but they can also identify cluster of communities with higher or lower rates. These geographic clusters can provide evidence of spatially specific normative environments- those that share characteristics across geographic space. In the United States, spatial analyses have revealed that IPV is higher in places where alcohol outlets are more dense (Cunradi, Mair, Ponicki, & Remer, 2011; Snowden, 2016). In other studies, IPV risk factors have been found to cluster by geography, identifying distinct communities or neighborhoods where violence risk is higher (Ackerson, Kawachi, Barbeau, & Subramanian, 2008; Beyer, Wallis, & Hamberger, 2015). These types of spatial analyses to predict IPV, however, are rare in low- and middle-income countries. To effectively prevent IPV perpetration, it is important to identify the geographic distribution and characteristics of groups with different risks for IPV perpetration so that

prevention programs can better understand the social-contextual profiles of men that leads to IPV perpetration.

This study takes place among husbands of adolescent girls in Niger. Niger ranked 187th out of 188 countries in the United Nations' 2016 Human Development Index (Jahan, 2016), with extremely high gender inequality and poverty. Niger has the highest rate of child marriage in the world: 3 out of 4 girls in Niger marry before their 18th birthday, putting their health and human rights at risk (Institut National de la Statistique (INS) & ICF International Enquête, 2013). Studies in India and Ethiopia have shown that child marriage is a risk factor for negative marital experiences, including IPV and forced sex (Erulkar, 2013; Raj, Saggurti, Lawrence, Balaiah, & Silverman, 2010; Speizer & Pearson, 2011).

The study aims to fill several gaps in the literature focused on men's IPV perpetration in western Africa using data collected from men who have married girls under 18 in Niger. Specifically, our objectives are to characterize the attributes of men who perpetrate IPV within this Niger context. We will 1) assess the relationship between experiences of parental violence and husband's IPV perpetration in adulthood, 2) assess the impact of depressive symptoms on mediating the relationship between childhood physical abuse and IPV perpetration, 3.) create a statistical profile of men who perpetrate IPV including normative and attitudinal factors along with negative affect and experience of parental violence, and 4) spatially understand the social-contextual profile of men who perpetrate IPV using a village-level analysis. While some of these relationships have been studied in North American, high-income, or English-speaking contexts, our study will be the first to examine these relationships within the western Africa context. We will build on previous work, using a large sample of married adolescent girls and their husbands

in Niger in order able to clearly assess the relationship between childhood physical abuse, negative affect, and IPV perpetration.

METHODS

In this research, we analyzed data that were collected across 48 villages clustered within the Dosso, Doutchi, and Loga districts in the Dosso region of Niger as part of the baseline data collection (i.e., no intervention activities had been implemented at the time of data collection) for a cluster randomized control trial (RCT) evaluating a family planning intervention (see Figure 1). Villages were randomly selected based on the following inclusion criteria: 1) having at least 1,000 permanent inhabitants; 2) primarily Hausa or Zarma-speaking (the two major languages of Niger); and 3) no known recent intervention specifically around family planning or female empowerment with married adolescent wives or their husbands. Both intervention and control villages from the RCT are included in this analysis.

Participants

The sample comprised adolescent wife (ages 13-19)-husband dyads (N=1,097). Participants were randomly selected (using a random number generator) from a list of all eligible married female adolescents provided by each village chief. Eligibility criteria for the married female adolescents include: 1) ages 13-19 years old; 2) married; 3) fluent in Hausa or Zarma; 4) residing in the village where recruitment was taking place with no plans to move away in next 18 months or plans to travel for more than 6 months during that period; 5) not currently sterilized; and 6) providing informed consent to participate in the study. Of those who were randomly selected,

88.0% participated in the baseline survey. No significant differences in wife age, husband age, or time spent away from the village were observed across those who did and did not participate. An equal number of respondents was chosen from each of the three districts.

Data Collection

Surveys were conducted separately with the young women and their husbands by sex-matched, trained research assistants from the Dosso region who could fluently read and speak French and fluently speak Hausa and/or Zarma. Research assistants visited the randomly selected households and conducted a Household Recruitment Screener to confirm eligibility. If the household was found not to include an eligible wife and husband, a randomly selected replacement was recruited in their place. Up to three visits were made to each of the selected participants; if they could not be reached after three attempts, no additional efforts were made.

Surveys were administered in a private location (out of earshot of another person, a place the participant indicated as private, typically in an outside area) in the village. Surveys were conducted in either the Hausa or Zarma language, depending on participant's language preference. The survey took approximately 40-60 minutes to complete and was administered using pre-programmed tablets. The encrypted, de-identified data were uploaded via secure internet connection on a weekly basis. We compiled the data into dyadic husband/wife observations to be able to include measures from both into our analyses.

Measures

Survey items for wives and husbands were close-ended questions constructed to reflect the experiences, meanings and language of the target population related to gender, violence, and

reproductive health, based on formative research findings, prior work of the project team, and existing validated instruments for men and women in low resource settings, including the DHS (Institut National de la Statistique (INS) & ICF International Enquête, 2013). The surveys were developed in English by UCSD, translated into French, back-translated to English for content reliability check, programmed in French, and verbally administered in Hausa or Zarma. As Hausa and Zarma are rarely expressed in written form, this is the translation protocol that has been most commonly utilized in the Niger context (Institut National de la Statistique (INS) & ICF International Enquête, 2013; Performance Monitoring and Accountability 2020 (PMA2020) Project INdlS, 2012). To ensure consistency, research assistants were trained on each item with an intended, agreed upon translation.

Husband IPV Perpetration as Reported by Wives

We used questions from the DHS domestic violence module to assess wives experiences of physical IPV (DHS, 2015). Girls were asked to report via 6 survey items whether in the history of her marriage her husband had ever pushed her, shaken her or thrown something at her; slapped her; twisted her arm or pulled her hair; hit her with his fist or something that could hurt her; kicked her, dragged her, or beat her up; or choked her or tried to burn her. We coded physical IPV perpetration as a binary "yes" if participants responded "yes" to any of these questions. Protocols modeled after the World Health Organization's guidelines for conducting research on violence against women (Ellsberg & Heise, 2005) were implemented to protect the safety and confidentiality of women participating in the study.

Individual IPV Acceptance

We adapted questions from the DHS men's questionnaires to assess individual attitudes expressing acceptance towards IPV (ICF International, 2011). Husbands were asked to report "In your opinion, is a husband justified in hitting or beating his wife in the following situations: (a) If she goes out without telling him? (b) Uses a family planning method without telling him? (c) Argues with him? (d) Refuses to have sex with him? (e) Burns his food? Answer choices were either "yes" or "no". Consistent with previous research we coded a person as positive on IPV acceptance if they answered positively to any of the five questions (Hindin, Kishor, & Ansara, 2008; Shakya et al., 2016). Alpha on the full measure for was 0.77.

Experience of parental violence

Men were asked two questions regarding experience of violence perpetrated by parents: "Before I was married, I was spanked or slapped by my parents in the home", and "Before I was married, I was beaten at home with a belt, stick, whip or another hard object". Men who responded "never" were coded as having not experienced parental violence, while those who responded "only once" or more were coded as having experienced parental violence.

Negative affect scale

Men were asked a series of 7 questions, using a modified version of the Patient Health Questionnaire Module 9, which measures severity of depressive symptoms (Arroll et al., 2010). Questions included "I would like to know if in the last 7 days (or one week) how often have you been bothered by each of the following. In the last 7 days have you: Felt tired, or like you have little energy?" with response options being "Not at all", "Some days" or "Nearly every day". We coded those who responded "Not at all" as 0, "Some days" as 1 and "Nearly every day" as 2, with a total possible score of 10. Two questions did not align with the scale in a factor analysis

and Cronbach alpha assessment (Felt bad about yourself—or felt that you are a failure, or that you have let yourself or your family down? and Had thoughts that you would be better off dead, or of hurting yourself in some way?, so we excluded them from the scale. Cronbach alpha on the final version was 0.79. As this scale has not been formally validated in this population, we will refer to it here as a negative affect scale.

Gender Role Attitudes Scale

Men were asked a series of questions, known as the Gender Equitable Men (GEM scale), to understand their personal attitudes on gender roles, with a focus on traditionally patriarchal, gender inequitable expectations for men's and women's behavior (Barker et al., 2015; Pulerwitz & Barker, 2008). The scale includes 25 questions with questions such as "A man should have the final word about decisions in the home." and "I think it is shameful when men engage in caring for children or other domestic work." to which men were asked whether they agreed or disagreed. We coded agreement as 1 and disagreement as 0. Many respondents also replied "Don't know"- a large enough proportion that excluding them from the analyses would potentially bias the sample. We tested the inclusion of Don't know as either a proxy for agreement, disagreement, or in between the two using an advanced cronbach's alpha analysis, and found that statistically the "Don't know" group was consistent with the disagreement group. We therefore categorized "Don't know"as 0, and then summed the total. We excluded two questions from the scale, which did not align with the other variables during a Cronbach's alpha analysis, allowing for a total possible score of 23, with a higher score meaning more strongly held beliefs in inequitable gender roles. Alpha for the scale was 0.87.

Social norms: gender role second order beliefs (GRSB)

Men were asked a series of seven questions to understand second order social beliefs regarding the roles of men and women in their communities. The items were adapted from the Gender Equitable Men (GEM) scale to better reflect second order beliefs. Individuals were asked whether they agreed or disagreed with the following statements: People in the village think that a) a woman's most important role is to take care of the home and cook for the family, b) that a man should have the final word about decisions in the home, c) that it is shameful when men engage in caring for children or other domestic work, d) that giving baths to children, changing their clothes, and feeding them is the mothers responsibility, e) that a woman should never question her husband's decisions even if she disagrees with them, f) that it is natural and right that men have more power in the family, and g) that if a man cooks or cleans it is shameful for his wife. We scored each question as 1 for an agree answer and 0 for a disagree or for those who answered "Don't Know". The highest score possible was 7, with a higher score reflecting perceptions of more inequitable community beliefs. Cronbach's alpha for the scale was 0.81.

Social norms: violence against women second order social beliefs:

In order to explicitly understand the perception of acceptability of violence against women, our version of the Gender norms scale excluded the following question "People in my village think that there are times when a woman deserves to be beaten." We included this as a separate measure, coding participants as 0 for disagree, and 1 for agree, and leaving those who replied "Don't Know" in their own category.

Sociodemographic covariates:

Sociodemographic data were collected as part of the Household Survey from the head of household, most often the husband, but others including the female participant were often present and, in some cases, provided reports. Our sociodemographic measures included characteristics of both men and their wives. We included husbands' and wives' ages in years, and husbands' and wives' education as a continuous measure from 0-3, with 0 representing no formal schooling, 1 incomplete primary, 2 completed primary, and 3 as past primary. We also included a binary measure for both spouses having received Quranic education. Family wealth was assessed using the standard household assets list (13) which we summed for each item that was reported in the home: a watch, a mobile phone, a bicycle, a motorbike or scooter, a car or truck, or an animal drawn cart. We also included a measure of food insecurity that asked whether in the last month the respondent or any member of the respondent's family went without eating the whole day because there was not enough food. Finally, we included number of children born to that couple, whether or not the couple lived with the extended family, number of other wives the husband had, whether the wife had engaged in agricultural work outside of the home in the past 12 months, ethnic group and district.

Statistical analysis

We used logistic regression on dyadic observations including both husbands' and wives' measures to assess the odds of a wife reporting having ever experienced IPV given the negative affect, attitudinal, and normative predictors plus sociodemographic covariates. We first ran bivariate models assessing the association of the negative affect, attitudinal and normative predictors with wives' IPV reporting then ran multivariate models adding in all sociodemographic covariates. We then added experience of parental violence.

RESULTS

Table 1 shows the summary statistics for the sample population. The average man's age was approximately 26 years old (25.58, SD 5.36), with 40% having wives that reported performing agricultural work. Wives reported ever having experienced IPV in 8% of the couples, while 50% of the men reported that IPV was acceptable within one of any of the five mentioned conditions, and 58% believed that the community supports IPV. The average negative affect score was 2.4 (SD 2), and 30% of men reported having experienced parental violence.

Table 2 shows the results of our initial set of logistic regression analyses. Model 1 shows the results of separate bivariate analyses for all of our primary predictors. We see that men who reported having experienced parental violence, with higher levels of negative affect, who report attitudes accepting of IPV, perceived norms accepting of IPV, and second order social beliefs (norms) accepting of gender inequity are more likely to perpetrate physical IPV. Holding individual attitudes accepting of gender inequity was not significant. In the multivariate model, Model 2, we find that inequitable gender norms, and individual attitudes accepting of IPV became insignificant, while negative affect and norms accepting of IPV were strongly significant. For every one standard deviation increase in negative affect, the odds of having perpetrated IPV increased by 1.40 (95% CI 1.13-1.75). In Model 3 we added in experience of parental violence, and found that the relationship between negative affect and IPV perpetration was somewhat attenuated though still positive, while experience of parental violence was still strongly associated with IPV perpetration (OR 2.16 95% CI 1.22-3.81). Similarly the relationship between experiencing parental violence and IPV perpetration is more robust when negative affect is removed from the model (beta 0.77 p=0.01, beta 0.93 p=<0.001 not shown). To test whether there is some potential mediating affect we ran a cross-sectional mediation analysis (Table SA 1). We tested whether exposure to parental violence might lead to negative affect

which would then increase the risk of perpetrating IPV. The mediation model was close to significant, with results suggesting that 17% of the association between experience of parental violence and IPV perpetration is mediated through negative affect.

We then looked at factors associated with experience of parental violence (Table 3). We first included all of our relevant independent variables and covariates as predictors of experience of parental violence in a multivariate logistic regression. We found that every one of our predictors of interest with the exception of inequitable gender attitudes was significantly associated with experience of parental violence: women's reports of IPV, attitudes and norms accepting of IPV, gender inequitable norms, and negative affect. Because experience of parental violence most likely preceded many of these factors, we then switched the direction of analysis, and ran separate models, using experience of parental violence as a predictor, and each of our initial independent variables as outcomes. Table 4 Model 1 shows the outcomes of these separate models when run as bivariate, and Model 2 as multivariate. All models include sociodemographic controls. We also included wives' report of doing agricultural work as an outcome, as it was significantly associated with both IPV perpetration and experience of parental violence across all models. Again all of the characteristics we tested were all positively significantly associated with experience of parental violence, with the exception of women's agricultural work which was negatively associated.

The results of these analyses provided evidence of an interconnected group of characteristics that distinguish some groups of men from others. To fine-tune this profile, we ran a cluster analysis, using a K-means partitioning method. We used an iterative method by which we added new variables into the analysis one by one, and then looked at the breakdown of the groups by characteristic. The results of this process and the scree plot suggested 3 groupings

were the most appropriate, with having experienced childhood violence, negative affect, perpetration of IPV, wife's agricultural work, and attitudes supporting of IPV as the discriminating variables. (Figure 2 shows a series of plots demonstrating the relationship between experience of parental violence, IPV perpetration, and our primary predictors). We see that Group 1 has a low proportion of reported IPV perpetration (5%), a relatively low proportion have experienced parental violence (14%), very low mean negative affect scores (0.05 on a scale of 0-1), and are high in wives agricultural labor (57%). Group 2 has the lowest rates of experiencing parental violence (5%), low rates of IPV perpetration (6%), moderate negative affect (0.35 on a scale of 0-1), and a low proportion accepting of IPV (31%). By contrast, group 3 has high rates of IPV perpetration (15%), high rates of experiencing parental violence (81%), high negative affect (0.43 on a scale of 0-1), a high proportion accepting of IPV (83%), and a low proportion with wives doing agricultural work (20%). Of the 3 groups, group 3 is the most starkly consistent in that negative affect, unequal norms and attitudes, experience of violence, and violence perpetration are all clearly clustered together. The groupings confirm our findings that there are constellations of associated characteristics related to violence and gender norms within this population. We can also see significant differences in gender attitudes and norms, however the variation on these measures are much smaller across groups. Figure 3 shows the group level differences broken down by characteristic. For some characteristics, such as IPV perpetration and experience of parental violence, the primary distinction is between groups 1 and 2 with group 3. For others however, such as negative affect and women's agricultural work, there are clearly differences across all 3 groups.

Previous work within this population has suggested that there are relevant village level differences in particular characteristics that may add to our understanding of how these factors interrelate (Silverman and Shakya, unpublished). As our data includes geographic coordinates for each village, we are able to look at the relationships between these factors spatially. In order to do a spatial analysis at the village level, we aggregated our measures of interest at the village level, and ran a grouping analysis in ARC GIS, with clusters differentiated using K nearest neighbors. The ARC GIS grouping analysis tool has a feature which will determine the optimal number of groups, given the characteristics entered into the analysis. In order to get a careful idea of how different factors help differentiate the groups, we began with one characteristic, beaten as a child, and iteratively added in the remaining characteristics to see how well they contributed to the groupings. A risk with including too many characteristics is that the result may include many groups, with values of each characteristic that are hard to interpret. In this case, our grouping analysis gave us 2 groups, no matter how many additional variables we included. To distinguish which combination was optimal, we used the grouping analysis results report which provides the R^2 for each variable included. In this case the R^2 is a measure of how well the variable is contributing to the grouping.

The grouping analysis identified 2 groups, distinguished spatially by 4 different measures: proportion of village in which wives report agricultural work, proportion of the village in which wives report husbands perpetrated IPV, men's means negative affect score, and proportion of the village who have reported experiencing parental violence. While in other iterations gender norms and attitudes, and IPV norms and attitudes were consistently different between the groups, they did not contribute enough to the grouping distinction to include in the final version. Figure 4 is a map of the village in the study region, with the blue circles

representing villages in which there are a high proportion of women doing agricultural work (mean 75%), low proportions of IPV perpetration (mean 4%), low proportions of experiencing parental violence (mean 12%), and low reported negative affect (mean 1.76). The red circles represent a very different profile with low proportion of agricultural work (22%), high levels of reported parental violence (40%), high levels of IPV (10%), and high levels of negative affect (2.66). Looking at the map, there is a clear cluster of blue villages in the North of the study region, with another clear cluster of pink villages further South. Figure SA 3 shows the breakdown of characteristics by group.

DISCUSSION

In this study, we sought to understand the characteristics of men who perpetrate IPV amongst a large sample of men married to adolescents in Niger, with a focus on reported negative affect and experience of parental violence. Our analysis provided evidence of a nexus of interrelated characteristics which we attempted to statistically identify through a cluster analysis, and geographically through a grouping analysis. Our analyses provided several compelling findings.

We first found a very strong association between negative affect and perpetration of IPV. While the scale used was not validated in this population, and we cannot therefore identify with certainty the underlying construct identified through this scale, we nevertheless saw that it was internally reliable, and strongly associated with IPV perpetration. The association between negative affect and IPV perpetration, however, was strongly attenuated by the inclusion of experience of parental violence in the model. Further exploration provided evidence of mediation- men who experienced parental violence may be more likely to experience negative

affect which in turn may increase their propensity to intimate partner violence. The limitation of cross-sectional data precludes any confident causal claims, however the statistical evidence suggests that further investigation is warranted.

Because IPV is often interrelated with inequitable gender norms and attitudes, and with attitudes and norms that support IPV, we included all four of those variables in the models. What we found was that besides the perception that community members thought IPV was acceptable, the other gender equity variables were not predictive of IPV. However when we explored further, and looked specifically at what factors are associated with experience of parental violence, we uncovered a constellation of factors, including attitudes and norms supportive of IPV, and those supportive of gender inequality. Our cluster analysis confirmed these distinctions. We were able to identify three distinct clusters, with varying levels of these different correlated characteristics.

Of distinct interest in our cluster analysis is the measures of women's engagement in agricultural work. Our previous work in this context has suggested that communities with high levels of agricultural work are those in which girls are more likely to be married at younger ages. The results of that study suggested that there were risks to girls in those communities. In this analysis, however, we are able to identify factors in which women's agricultural work is a cultural marker for individuals that may be less gender segregated, less prone to violence, and less susceptible to experiences of negative affect- controlling for other factors which could be associated with those characteristics such as ethnic group, religion, income, and age. Importantly this pattern applies at the village level as well, and is also geographically clustered. Villages in which in women are more likely to engage in agricultural work are those in which violence overall is lower, gender inequality less pronounced, and negative affect less common. These villages are also geographically proximal. The factors that most strongly discriminated these

villages were women's agricultural work, experience of parental violence, IPV perpetration, and reports of negative affect.

This clustering of characteristics is very compelling evidence that there are normative factors supporting interpersonal violence in communities, that violence perpetrated against children is a significant risk factor for violence perpetrated as an adult, and that these characteristics of men that are prone to violence are interrelated both with negative affect, and with norms and attitudes that support both violence against partners, and gender inequality. Intervention approaches that fail to consider this interrelated web of factors may be unsuccessful at preventing violence, as the fundamental nexus of supporting factors may need to be addressed for interventions to be effective.

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Table 1 Descriptive Statistics

	Mean	SD	%
Wife's age	17.33	1.53	
Husband's age	25.58	5.36	
Wife's education 0-3	**0.51**	**0.80**	
Husband's education 0-3	0.73	0.89	
Quranic school Husbands			34%
Household assets 0-6	2.07	1.17	
Food insecurity			20%
Wife agricultural labor			42%
Number of children	0.93	0.96	
Number of wives	1.15	0.40	
Ethnic group Hausa			31%
Ethnic group Zarma			69%
Ethnic group Tuareg			0.05%
District Dosso			32%
District Doutchi			33%
District Loga			35%
Wife reports IPV			8%
IPV acceptance binary Husband			50%
Husbands gender role attitudes	18.00	3.8	
Husbands gender role second order social beliefs scale 0-7	5.9	1.62	
Husband VAWSB community supports yes			58%
Husband VAWSB community supports doesn't know			8%
Proportion experienced parental violence			30%
Negative affect score	2.36	2.0	

Table 2 Logistic regression model outcome women's report of IPV

	Model 1 Bivariate associations			Model 2 Multivariate associations			Model 3 Model 2+experience parental violence		
Experience of parental violence	1.19	0.24	0.00				**0.77**	**0.29**	**0.01**
Depression 0-10	0.21	0.06	0.00	**0.17**	**0.06**	**0.01**	**0.11**	**0.07**	**0.10**
People expect beating Don't know	0.93	0.45	0.04	0.73	0.48	0.12	0.73	0.48	0.13
People expect beating yes	0.80	0.29	0.01	**0.74**	**0.34**	**0.03**	**0.64**	**0.35**	**0.07**
Gender inequitable social norms	0.18	0.09	0.05	0.09	0.11	0.42	0.05	0.11	0.66
Attitudes accepting of IPV	0.34	0.24	0.16	-0.13	0.30	0.67	-0.22	0.30	0.46
Gender inequitable attitudes	0.00	0.03	0.98						
Women's age				-0.05	0.10	0.61	-0.05	0.11	0.65
Man's age				0.00	0.03	0.95	0.00	0.03	0.98
Years married				0.01	0.09	0.92	0.01	0.09	0.91
Education W				**-0.43**	**0.20**	**0.03**	**-0.42**	**0.20**	**0.03**
Education M				0.01	0.16	0.97	-0.03	0.16	0.86
Coranic school				0.18	0.27	0.51	0.08	0.27	0.77
Agricultural				**-0.80**	**0.32**	**0.01**	**-0.70**	**0.33**	**0.03**
Number of children				0.19	0.18	0.30	0.18	0.18	0.33
Number of wives				-0.72	0.51	0.15	-0.71	0.51	0.16
HH Assets				-0.12	0.11	0.28	-0.13	0.11	0.26
Food insecurity				0.11	0.29	0.70	0.11	0.29	0.72
as.factor(tribe)2				**1.43**	**0.68**	**0.04**	**1.40**	**0.67**	**0.04**
as.factor(tribe)3				1.25	1.28	0.33	1.35	1.24	0.28
as.factor(dis)Doutchi				**1.29**	**0.69**	**0.06**	1.32	0.68	0.05
as.factor(dis)Loga				**-0.64**	**0.34**	**0.06**	-0.54	0.35	0.12

Table 3 Multivariate logistic regression analysis of factors associated with men reporting experience of parental violence

	Beta	Se	p
Wife reports IPV	**0.81**	**0.28**	**0.00**
Depression 0-10	**0.36**	**0.04**	**0.00**
People expect beating Don't know	0.34	0.36	0.35
People expect beating yes	**0.67**	**0.22**	**0.00**
Gender inequitable social norms	**0.23**	**0.07**	**0.00**
Attitudes accepting of IPV	**0.78**	**0.20**	**0.00**
Gender inequitable attitudes	**0.00**	**0.03**	**0.98**
Women's age	-0.06	0.07	0.38
Man's age	**0.05**	**0.02**	**0.03**
Years married	-0.09	0.06	0.15
Education W	0.14	0.11	0.21
Education M	**0.17**	**0.10**	**0.09**
Coranic school	**0.66**	**0.18**	**0.00**
Agricultural	**-0.59**	**0.20**	**0.00**
Number of children	**0.23**	**0.13**	**0.08**
Number of wives	-0.24	0.26	0.36
HH Assets	0.05	0.08	0.48
Food insecurity	-0.15	0.22	0.49
as.factor(tribe)2	0.13	0.55	0.81
as.factor(tribe)3	-0.03	1.09	0.98
as.factor(dis)Doutchi	-0.19	0.55	0.73
as.factor(dis)Loga	**-1.04**	**0.23**	**0.00**

Table 4 Experience of parental violence as a predictor of characteristics associated with IPV perpetration, including norms and attitudes.

	Separate bivariate models			Separate multivariate models		
	Beta	Se	p	Beta	Se	p
IPV reported	1.18	0.24	0.00	0.78	0.28	0.00
Depression 0-10	1.57	0.13	0.00	1.44	0.14	0.00
People expect beating	1.07	0.17	0.00	1.13	0.18	0.00
Social beliefs	0.66	0.11	0.00	0.52	0.11	0.00
GEM	1.30	0.26	0.00	1.34	0.27	0.00
IPV attitudes	1.38	0.16	0.00	1.33	0.17	0.00
Agricultural	-0.98	0.16	0.00	-0.88	0.18	0.00

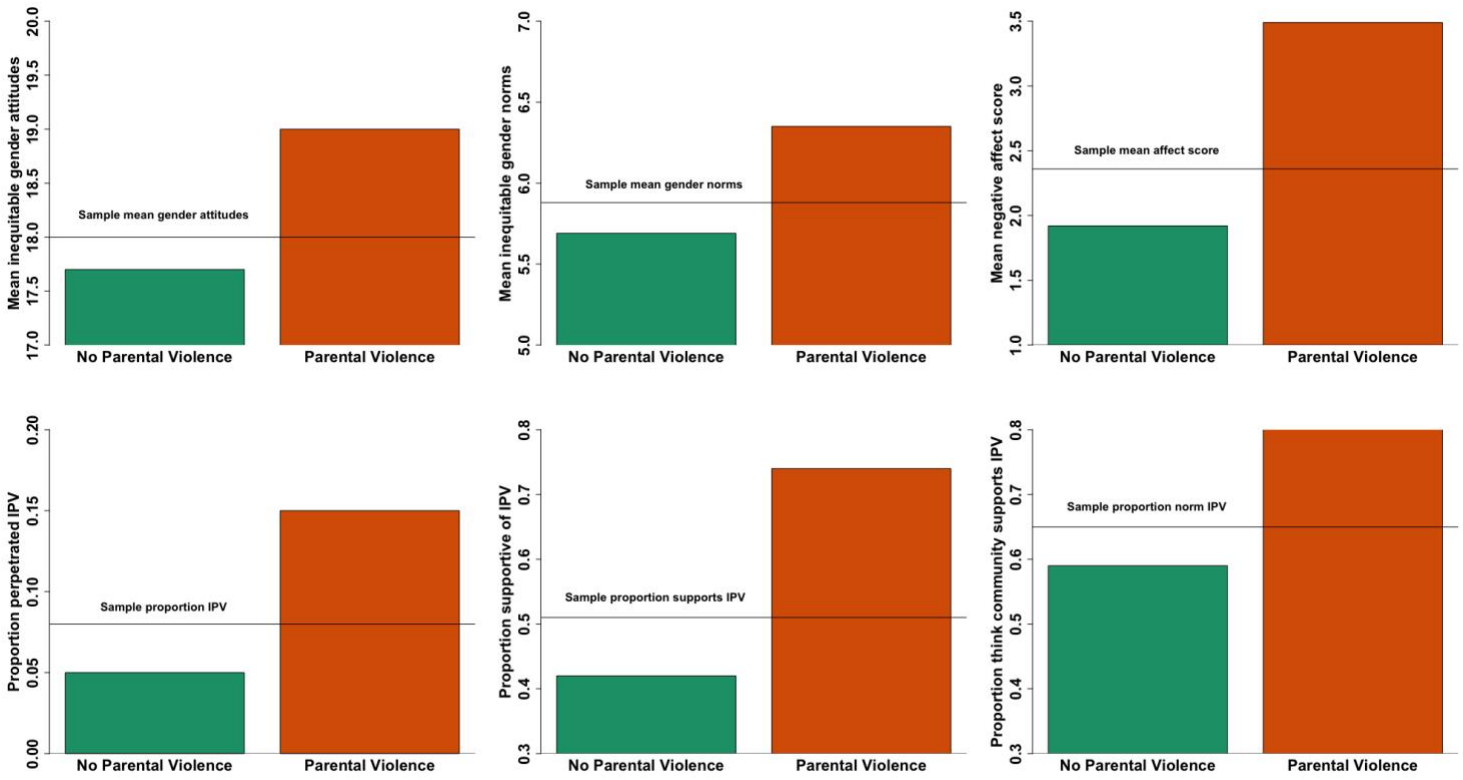

Figure 1: Differences in means and proportions of select attributes between those who reported parental violence and those who did not.

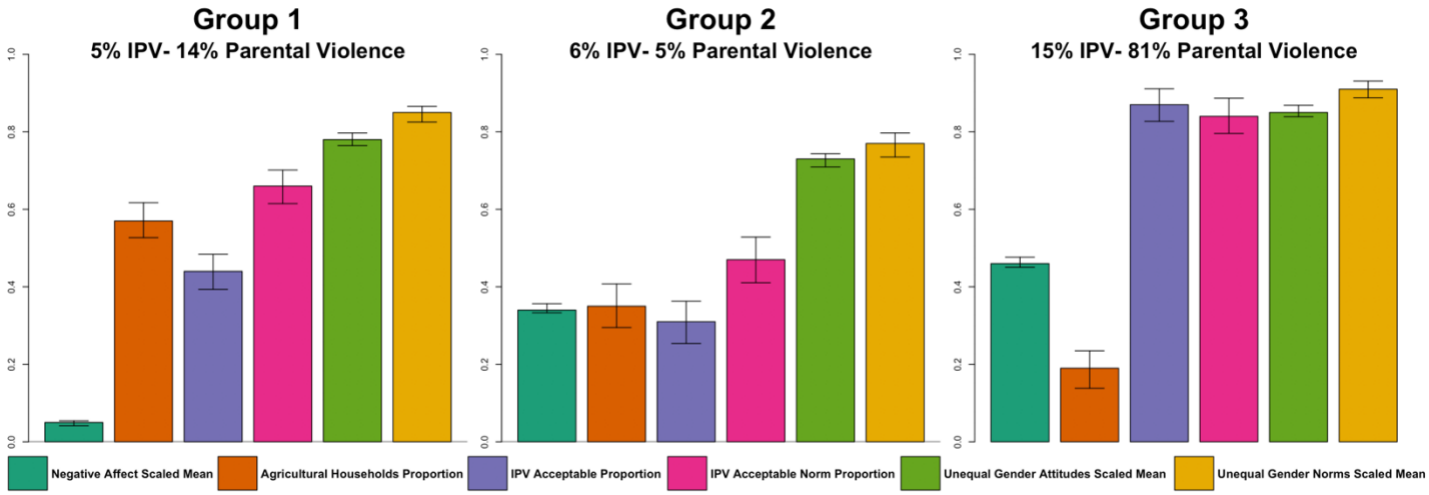

Figure 2: Means and proportions of characteristics associated with IPV perpetration across groups identified through a K-means cluster analysis. Group 3 stands out as the most distinct, with high levels of negative affect, individual IPV acceptance, perceived norms in support of IPV, experience of parental violence, and IPV perpetration. This group also has the lowest proportion of men whose wives engage in agricultural labor. To maintain consistency across characteristics, we used scaled means for continuous variables and proportions for binary.

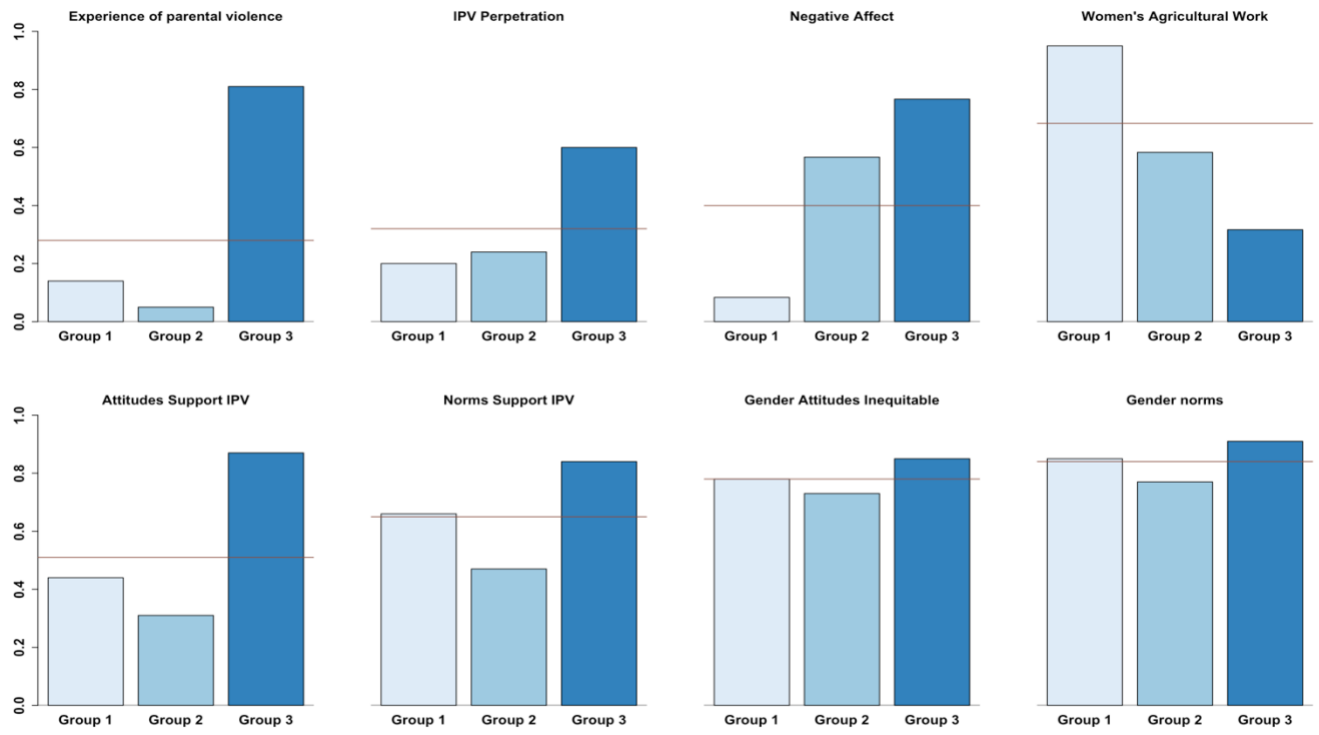

Figure 3

Group-wise breakdown of attributes associated with IPV perpetration. Sample means and proportions are represented by the thin line across each plot. Continuous variables are represented on a scale of 0-1 for comparability.

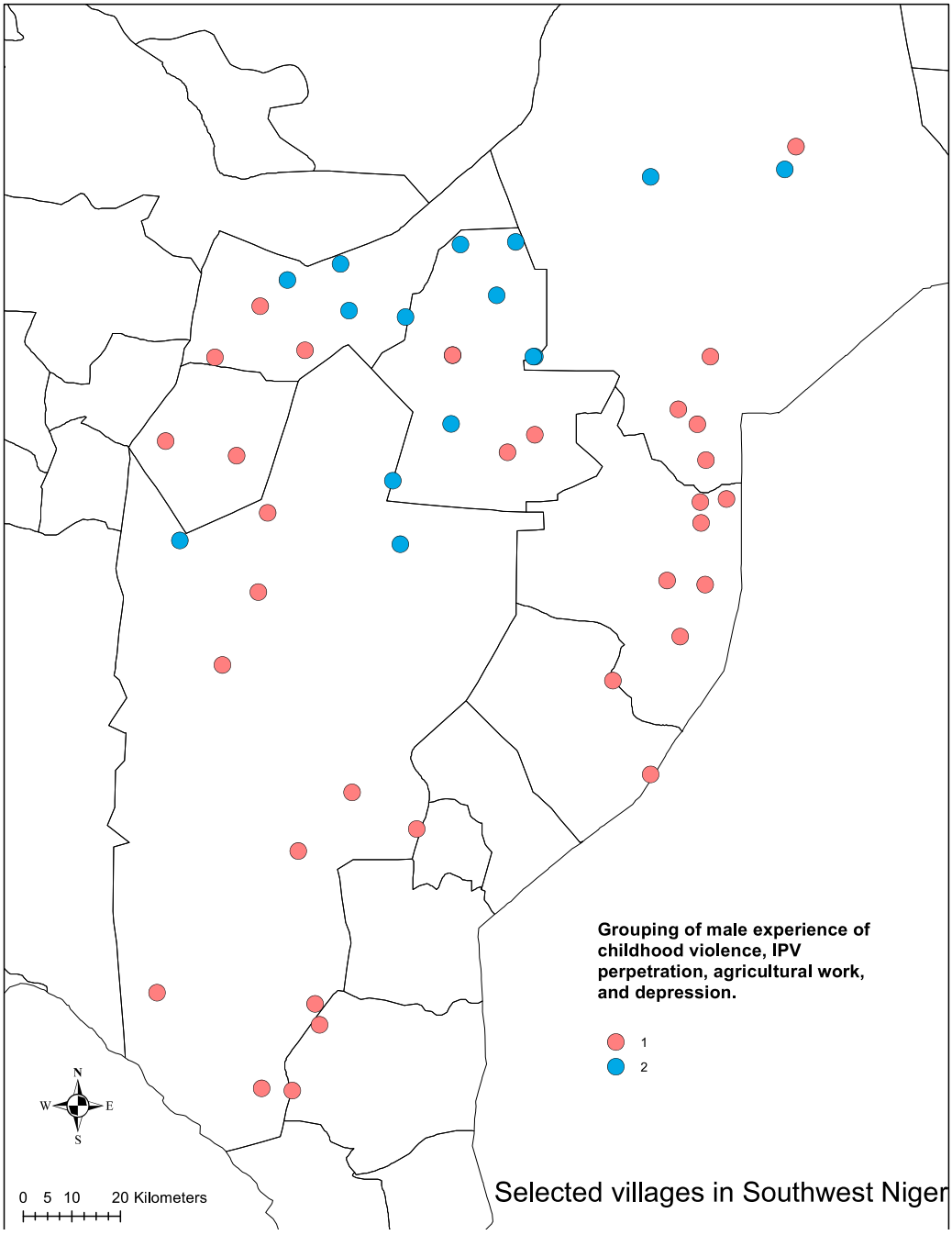

Figure 4: Geographic grouping analysis of village in rural Niger by experience of childhood violence, IPV perpetration, women's agricultural work, and negative affect. Blue colored villages have low mean levels of negative affect, high proportion of women doing agricultural work, low rates of IPV, and low levels of reported parental violence. Salmon colored villages are the opposite.

Table SA 1
Mediation is close to significant, suggestive that the pathway between childhood experience of violence and IPV perpetration is partially mediated through depression.

ACME	(control)		0.01	0.00	0.02	0.06
ACME	**(treated)**		**0.02**	**0.00**	**0.03**	**0.06**
ADE	(control)		0.06	0.01	0.11	0.01
ADE	(treated)		0.06	0.02	0.12	0.01
Total	Effect		0.07	0.03	0.13	0.00
Prop.	Mediated	(control)	0.13	0.00	0.46	0.06
Prop.	Mediated	(treated)	0.22	-0.01	0.54	0.06
ACME	(average)		0.01	0.00	0.03	0.06
ADE	(average)		0.06	0.02	0.11	0.01
Prop.	Mediated	(average)	0.17	0.00	0.50	0.06

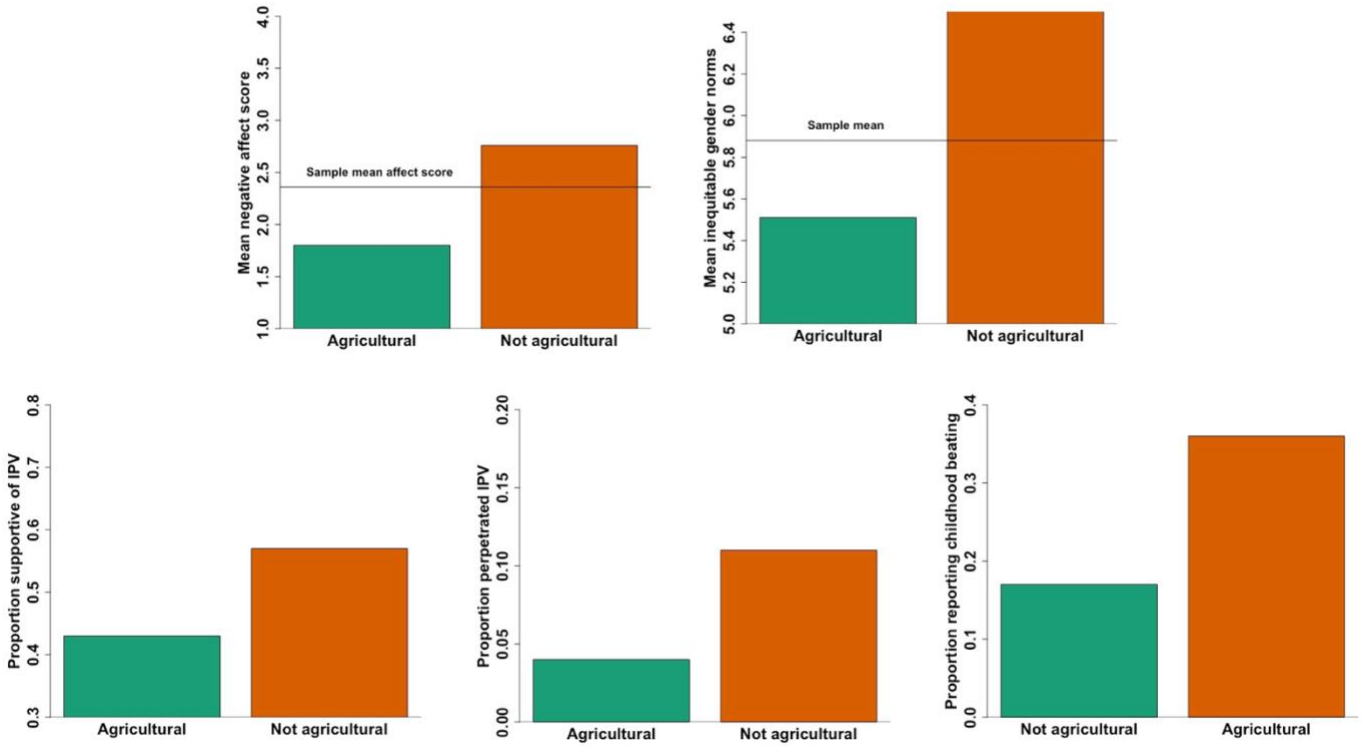

Figure SA 1
Differences between couples in which women participate in agricultural work and those in which they don't. Across all 5 of these metrics, agricultural work is associated with less inequitable gender norms, less negative affect, less support for IPV, less perpetration of IPV, and less reporting of parental violence.

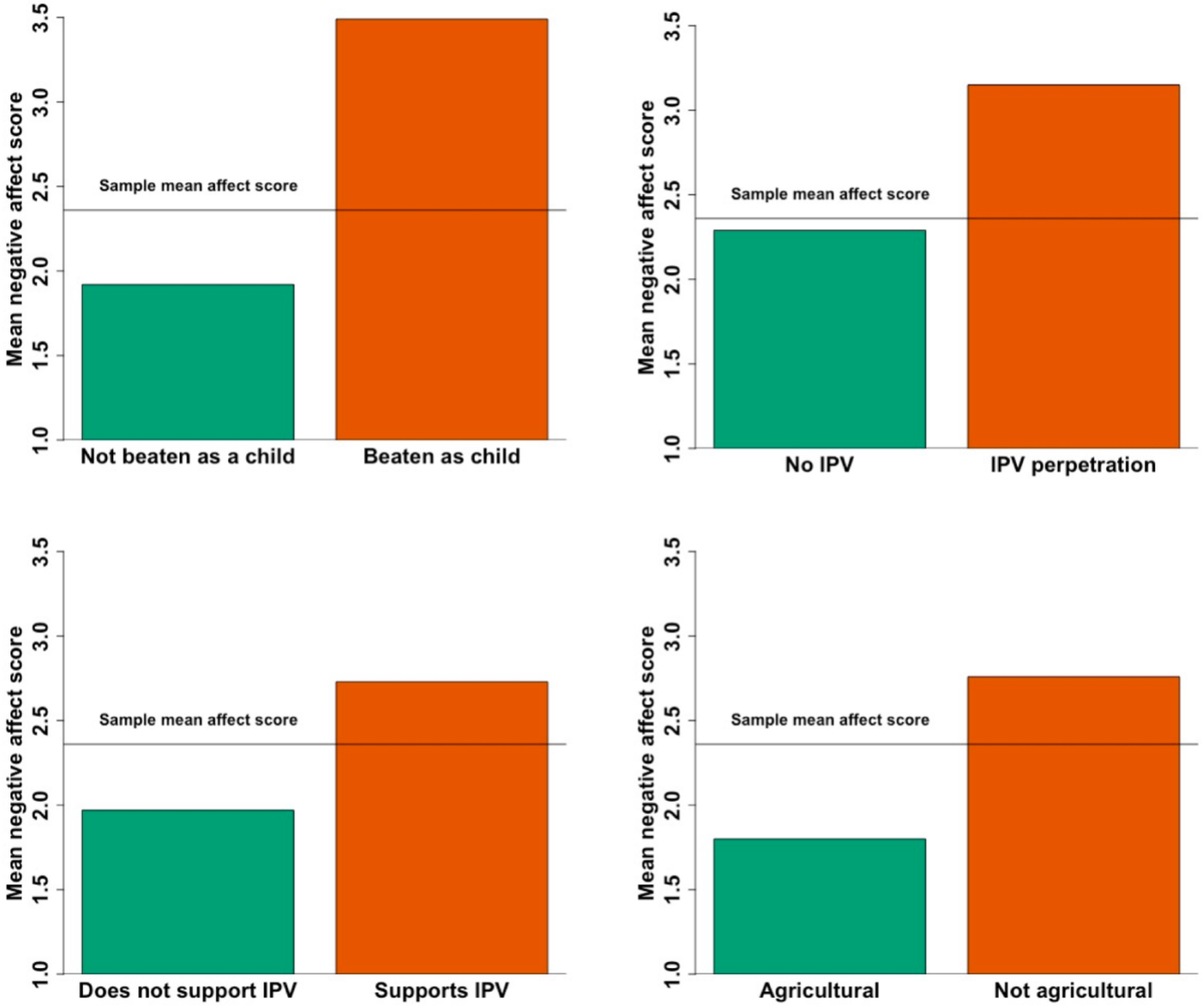

Figure SA 2
Negative affect is also significantly associated with many other characteristics, including higher likelihood of supporting IPV, having perpetrated IPV, experience of parental violence, and lower likelihood of agricultural work.

Table SA 2
Cluster Analysis

Group.1	chbeat	ipv	depm	winc	ipvm	mipvn	genrolem	sbm2
1.00	0.14	0.05	0.05	0.57	0.44	0.66	0.78	0.85
2.00	0.05	0.06	0.34	0.35	0.31	0.47	0.73	0.77
3.00	0.81	0.15	0.46	0.19	0.87	0.84	0.85	0.91

Figure SA 3
Results of a geographic grouping analysis conducted using ARC GIS. The group level proportion/mean of each discriminating characteristic is provided by the analysis, as well as an R2, that provides a measures of how well each variable helped to distinguish the groups.

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