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**THE AGE-IPV CURVE: CHANGES IN INTIMATE PARTNER VIOLENCE  
PERPETRATION DURING ADOLESCENCE AND YOUNG ADULTHOOD**

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**Abstract**

Research on intimate partner violence (IPV) has evolved over the last decade with increasing interest in how IPV develops over adolescence and young adulthood. Studies examining patterns of IPV over time have generally focused on victimization with less attention to temporal shifts in perpetration. While it is generally assumed that IPV peaks during young adulthood, this has not been empirically verified and documented. Additionally, prior longitudinal analyses of IPV have focused on identifying trajectories and their accompanying risk factors, with less attention given to within-individual change in IPV experiences across and within relationships. Drawing on five waves of data from the Toledo Adolescent Relationships Study (TARS), we examined patterns of IPV perpetration among a diverse sample of adolescents and young adults (51.1% female, 63.9% non-Hispanic White, 24.6% non-Hispanic Black, 11.5% Hispanic) spanning the ages of 13 – 28 years (N = 1,164). Analyses demonstrate that IPV patterns deviate from the age-crime curve, as women's IPV involvement increases as their antisocial behavior is decreasing. While traditional behavioral and psychological risk factors accounted for some of the age variation in IPV for men, they did not account for age variations in IPV among women. Relationship risk factors, however, accounted for substantial portions of the age-IPV perpetration relationship for male and female youths. These findings reinforce recent calls for prevention efforts that focus on the development of healthy relationships.

## Introduction

Over the last several decades, intimate partner violence (IPV) has garnered considerable research attention. The resulting body of work has yielded much information regarding risk factors associated with IPV perpetration (Carney, Buttell and Dutton 2007; Fang and Corso 2008; White and Chen 2002; White and Widom 2003) and victimization (Cunradi, Caetano and Schafer 2002; Halpern et al. 2009; Tjaden and Thoennes 2000). From an initial focus on adults, the field has grown to include attention to the experience of violence within teen relationships (e.g., Giordano et al 2010; Jouriles et al. 2012; Hamby, Finkelhor, and Turner 2012), and some research has examined the role of teen violence itself as a risk factor for later adult experiences (Cui et al. 2013; Gómez 2011; Halpern et al. 2009). Thus, developments within the field increasingly highlight the utility of a life course perspective. Yet research has not documented age-related patterns of IPV that span adolescence into young adulthood, and information about temporal changes in IPV perpetration is particularly limited. Data sets such as the National Longitudinal Study of Adolescent Health (Add Health), include detailed reports about victimization experiences, but do not elicit information about perpetration of IPV at the earlier interviews. It is important to examine IPV perpetration across adolescence and young adulthood, when risk may be at its peak.

Scholars such as Felson and Lane (2010) have argued that patterns of IPV should operate in a manner similar to other forms of antisocial behavior. Indeed criminologists have shown delinquency and crime to follow a fairly predictable pattern (referred to as the age-crime curve) (Hirschi and Gottfredson 1983; Steffensmeier and Streifel 1991; Stolzenberg and D'Alessio 2008; Sweeten, Piquero, and Steinberg 2013). We evaluate whether the age-IPV curve parallels the typical age-crime curve extensively explored and documented in prior research. There is wide gender divergence in male and female self-reports of involvement in delinquency and criminal behavior (Tittle, Ward, and Grasmick 2003) and the age-crime curve exemplifies male patterns of delinquency. Because prevalence rates of male-to-female IPV perpetration (Whitaker et al. 2007; Caetano, Vaeth, and Ramisetty-Mikler 2008) are not as divergent as delinquency patterns, the age-IPV curve may follow a similar course for men and women. Recent studies examining the etiological processes of IPV suggest a prominent role for relationship risk factors, rather than the traditional familial and socioeconomic factors that tend to be reliable predictors of criminal involvement (Capaldi and Kim 2007; Pepler 2012). This further suggests that the developmental patterns of IPV perpetration will differ from delinquency patterns.

Studies of victimization patterns are critically important from a public health standpoint. Yet, recent work examining IPV among adolescent and young adults based on community studies consistently find perpetration and victimization experiences to be highly correlated (Caetano et al. 2008; Melander et al. 2010). High injury rates have been reported among those experiencing bidirectional violence (Whitaker et al. 2007), which characterizes the majority of young adult IPV experiences (Renner and Whitney 2012). Additionally IPV perpetration has been found to be associated with lower levels of perceived health (Coker et al. 2000) and increases in depressive symptomatology (Johnson et al. 2014). Thus, analyses of victims only provide a limited understanding of IPV experiences. Assessments of perpetration are necessary to provide a complete portrait, and have direct implications for understanding risk exposure.

Drawing on five waves of data from the Toledo Adolescent Relationships Study (TARS), our aim is to develop a portrait of the relationship between age and IPV perpetration among a diverse sample of adolescents and young adults spanning the ages of 13 – 28 years (N = 1,164). Establishing a recognized age-related pattern of IPV perpetration may help provide a launching point for future theoretical and empirical studies aimed at identifying distinguishing risk factors associated with onset, persistence, intermittency, and desistance of relationship violence. Greater understanding of these developmental processes can work to promote healthy relationships that potentially safeguard against IPV. We investigated whether the observed age-related pattern of IPV perpetration varies by gender, and is unique from age-related patterns of general antisocial behavior, as well as what accounts for age variation in IPV perpetration. While prior studies have given primacy to behavioral and psychological characteristics (antisocial behavior, alcohol and substance use, depressive symptoms) that trace their roots to childhood and adolescent experiences, the current study highlights relationship risk factors that are more proximal to IPV perpetration and their ability to account for age variation in the age-IPV perpetration curve.

### **Changes in Intimate Partner Violence and Risk Factors**

Early theories of intimate partner violence (IPV) posited that male patterns of aggression would escalate over time, increasing in both frequency and severity (e.g., Walker 1984). This early work, with its reliance on married adult samples, focused primarily on the patterns of IPV within a given relationship (e.g., O’Leary et al. 1989). Contemporary research on IPV, however, has broadened the focus to include variation in IPV across intimate relationships (Carbone-Lopez, Rennison, and MacMillan 2012; Shortt et al. 2012; Whitaker, Le, and Niolon

2010). This shift reflects a growing interest in understanding not only whether IPV changes over time within a relationship, but also age-related patterns of IPV that transcend relationship continuity.

It is important to consider how IPV changes across relationships since it is generally assumed that IPV reaches its peak during late adolescence and young adulthood (O'Leary 1999) and there is considerable turnover in romantic partners during this period (Felmlee 2001). Whitaker et al. (2010) found that while IPV perpetration in a prior relationship was positively associated with IPV perpetration in the subsequent relationship, 70.3% of those prior perpetrators had desisted, thus demonstrating the high rate of variability in IPV experiences across relationships. Shortt et al. (2012) found that stability in IPV perpetration among their sample of men was greater within relationships (meaning those who remained with the same partner), than across relationships (those who changed partners). They also found that IPV perpetration was highest among these men during the early twenties, followed by subsequent declines.

The above work represents an important step forward by showcasing that while there is a degree of stability in IPV perpetration, there is also considerable change. What remains unanswered is why IPV involvement increases across the life stages of adolescence and young adulthood and subsequently decreases as young people progress through their twenties. To account for age-related changes in IPV perpetration, we selected variables previously identified as relating to IPV perpetration. These include behavioral and psychological risk factors, as well as risk factors specific to the relationship context.

#### Behavioral and Psychological Risk Factors

##### *Antisocial Behavior*

Developmental and life course criminology have considered the association between antisocial behavior and IPV using samples that include both men and women (e.g., Magdol et al. 1997; Ehrensaft, Moffitt and Caspi 2004; Lussier, Farrington, and Moffitt 2009). Such work has generally tested the competing hypotheses of stability (population heterogeneity), and change (state-dependent) that are also thought to underlie patterns of antisocial behavior and crime (*See* Cernkovich and Giordano 2001). Childhood and adolescent risk factors theorized to influence ongoing antisocial behavior in the form of generalized violence, alcohol and substance use, and other forms of offending, are posited as exerting a similar influence on IPV (Simons, Lin, and Gordon 1998). Such work suggests that IPV and antisocial behavior are likely to follow a similar age pattern.

Consideration of women's IPV perpetration continues to be a controversial topic (Palmetto et al. 2013), and there are few studies examining trends in women's IPV perpetration across the life course in general, and more specifically how women's IPV perpetration may relate to other patterns of offending. Felson (2006) distinguished between a "gender perspective," which suggests an etiology that is IPV-specific, and a "violence perspective," which suggests more similarities than differences between IPV and other violent offenses. The violence perspective also assumes that risk factors will operate similarly for men and women. Evidence from past studies has provided support for the view that those men and women who engage in the most serious forms of IPV, namely intimate partner homicide, are similar to other violent offenders irrespective of gender (Felson and Lane 2010; Felson and Messner 1998). This work, however, has limitations due to the emphasis on a particular subset of the population (e.g., homicide offenders), and exclusive focus on adults. In contrast to the research on homicide offenders, prior survey research has consistently demonstrated that girls' and young women's levels of antisocial behavior, including violence, are lower relative to patterns exhibited by boys and young men (Park, Morash, & Stevens 2010; Steffensmeier et al. 2005). Nevertheless, studies examining intimate partner violence using community- and school-based samples have generally found rates of female perpetrated violence that are as high or higher than those of male perpetrated violence, particularly among younger samples (Whitaker et al. 2007; Melander, Noel, & Tyler 2010; Archer 2000). Given the discordance between patterns of antisocial behavior and IPV perpetration among female respondents, we expect that the degree to which antisocial behavior can account for changes in IPV perpetration among adolescent girls and young women may be limited.

#### *Alcohol and Substance Use*

Alcohol and substance use is often cited as a major proximal predictor of IPV (Leonard 1993; Magdol et al. 1997; Coker et al. 2000). While the precise mechanisms remain unclear, alcohol and substance use has been theorized to influence IPV by decreasing self-regulation (Flanzer 2005), increasing negative affective states (e.g., depression) (Fagan and Browne 1994), exacerbating relational conflicts (Quigley and Leonard 2000), or eroding relationship quality (White & Chen 2002). Work examining patterns of alcohol and substance use has found that it initiates during adolescence and continues to increase through the early twenties (Chassin, Flora, & King 2004). In a recent meta-analysis, Capaldi et al. (2012) reported that while there is evidence that IPV and alcohol and substance use are linked, the association may not be straight-forward. Alcohol and substance use are often bound up with other antisocial behaviors, such as delinquency and criminal offending. Yet alcohol use becomes normative and

legal in young adulthood suggesting a potentially less direct link between alcohol use and IPV as respondents move from adolescence into adulthood. Further, associations with IPV attributed to alcohol and drugs may be an artifact of the relationship between other, more general offending behaviors and IPV.

### *Depressive Symptoms*

While prior work has found IPV to be associated with increases in depressive symptomatology (Johnson et al., 2014), it is possible that the relationship is reciprocal. Yet studies examining the association between depressive symptoms and IPV perpetration have yielded mixed results (Caetano et al. 2008; Melander, Noel, & Tyler 2010). Since these examinations have relied on perpetration data limited to adults in the Add Health, further consideration of this association is warranted. Prior studies examining trajectories of depressive symptoms have observed increases during adolescence, and by young adulthood levels have either plateaued or slightly declined (Meadows, Brown, & Elder 2006; Wickrama et al. 2008). Trajectories for teen girls and young women demonstrate higher levels of depressive symptoms relative to their male counterparts, particularly during adolescence and greater variability (Johnson et al. 2014; Galambos, Barker, & Krahn 2006; Ge et al. 1994). Given that women's trajectories of depressive symptoms typically display greater variation over the transition from adolescence to young adulthood relative to men's trajectories, we expect depressive symptoms to be more meaningful in accounting for age-related changes in IPV perpetration among female youths.

### Relationship Risk Factors

#### *Relationship Type and Continuity*

As young people progress through adolescence, relationships take on greater psychological centrality (Giordano et al. 2012), and increase in duration (Furman and Shaffer 2003). During the transition to adulthood, dating relationships transform into the more committed unions associated with cohabitation and marriage (Raley, Crissey, and Muller 2007). Rate comparisons of IPV among dating, cohabiting and married couples find cohabiting couples have the highest risk of IPV, followed by married couples and then daters (Brown and Bulanda 2008). Relationship continuity has also been linked to increased risk of IPV. Examining men's IPV perpetration against women, Shortt et al. (2012) found greater stability in IPV among those who retained partners relative to those who changed partners. These results suggest movement into more serious relationships of longer duration, likely accounts for increases in IPV involvement during young adulthood.

### *Relationship Stressors*

A key activity during young adulthood is pursuing higher education as well as greater participation in the paid labor force. Gainful activity in the form of education and employment have generally been viewed as protective against the risk of IPV as they represent sources of social and economic capital (Zweig 2004). Individuals who lack such resources are posited to be at greater risk for stress and its related outcomes including feelings of hostility (Conger et al. 1993). Prior work examining partner aggression revealed that lack of gainful activity had its greatest effects when both partners were idle (Alvira-Hammond et al. 2013). This association was present among dating couples, as well as coresidential partnerships.

The mean age at first birth is age 25 (National Vital Statistics System 2013) so young adulthood is a period when there are transitions into parenthood. The presence of children in the household has been identified as a source of relationship stress. Disagreements between partners may arise over childrearing issues including discipline, and the division of childcare responsibilities (DeMaris et al. 2003). Additionally, the presence of children (particularly preschoolers) has been associated with lower marital quality (Amato et al. 2003). Thus, while transitions into adult roles bring about opportunities for the development of social capital that may protect against antisocial behavior (Laub and Sampson 2003), entry into parenthood, or failure to achieve gainful activity may exacerbate relationship stress, and facilitate verbal disagreements that have the potential to erupt into violence.

### *Relationship Quality*

In the current study we considered three relationship characteristics reflecting relationship quality and linked to IPV in previous studies: disagreements, trust, and jealousy. Frequency of disagreements is an important precursor to partner violence and an indicator of psychological aggression (Capaldi et al. 2012). DeMaris et al. (2003) for example, found that frequency of disagreements increased the odds of physical aggression by 7% in their adult sample. Furthermore, levels of disagreement tend to vary across relationships (Laursen and Hafen 2010), highlighting the need to consider the longitudinal association with IPV. Few studies have considered the effects of trust on IPV. Amato and Booth (2001) theorized that individuals lacking in trust may engage in behaviors that compromise relationship quality. This is consistent with work from Linder et al. (2002), which found romantic relational aggression to be associated not only with lower levels of trust, but also higher levels of jealousy. Prior work has found that males and females are equally likely to identify jealousy as a precipitating factor for IPV



(O'Keefe 1997). As discussed previously, the sequential progression of intimate involvement leads to relationships that are characterized by longer duration, greater saliency, and higher levels of commitment (Connolly et al. 2004; Meier & Allen 2009). For many, these may represent positive developments, including improvements in relationship quality such as lower frequency of disagreements and jealousy, and greater trust (Giordano et al. 2012). Intimate relationships in early adulthood relative to those in adolescence, however, are also likely to afford more opportunities for disagreements to occur and potentially escalate into violence by sheer virtue of their longer duration and because partners may be living together as a cohabiting or married couple.

### **The Present Study**

Over the last decade, research on IPV has progressively made use of longitudinal data and evolved in meaningful ways. There is increasing interest in developmental patterns of IPV (Capaldi and Kim, 2007; Ehrensaft, Moffitt and Caspi 2004), as well as the heterogeneity within these patterns (Swarthout et al. 2011). We contribute to these efforts in two ways. First, it is generally assumed that IPV peaks during the early twenties (Capaldi and Kim 2007; O'Leary 1999). Yet to date, this has not been verified through a direct examination of IPV patterns across adolescence and young adulthood using a continuous measure of age. We hypothesize that an age-IPV curve will likely confirm patterns theorized in prior work, demonstrating an increase during adolescence, peaking in the early twenties, followed by subsequent decreases. While we expect this pattern to be similar for male and female youths, we expect trajectories for teen girls and young women to be higher than their male counterparts. Second, an ongoing limitation within the existing IPV literature is its primary focus on between-individual differences. Consideration of within-individual change is necessary in order to fully understand age-related changes (Sampson and Laub 2005; Sweeten, Piquero and Steinberg, 2013). In the multivariate analyses, we examine how changes within individuals correspond to within-individual change in IPV while controlling for unmeasured heterogeneity that could influence selection processes. That is, we are less concerned with distinguishing one trajectory from another, but rather, our focus is on predicting change within an individual's trajectory regardless of whether that trajectory is high, moderate, or low. Of primary importance is the extent to which these within-individual changes account for age variation in IPV. We hypothesize that relationship factors will do more in explaining variation in IPV perpetration by age than behavioral and psychological risk factors due to their proximity. Furthermore, we hypothesize that behavioral and psychological risk factors will be more influential in explaining age-related patterns

of IPV for male youths than female youths, while relationship risk factors will operate similarly across gender in explaining age-related patterns of IPV.

## **Methods**

### Overview of Study Data

The TARS sample ( $n = 1,321$ ) was drawn from the year 2000 enrollment records of all seventh, ninth, and eleventh graders in Lucas County, Ohio. The sampling frame consists of 15,188 eligible students, and is divided into 18 strata by grade, race-ethnicity (non-Hispanic White, non-Hispanic Black, and Hispanic), and gender. Random subsamples were selected from each strata to achieve a total sample of 2,273 students. Of these students, we contacted 1,625, with 304 refusals, resulting in a total sample of 1,321, or 81.3 percent of the original 1,625 students who were contacted. The stratified, random sample, devised by the National Opinion Research Center, oversampled black and Hispanic adolescents. Unlike school-based studies, school attendance was not required for sample inclusion. We conducted interviews in respondents' homes using preloaded laptops to maintain privacy.

### Analytic Sample

For the current study we used data from all five waves. Wave 1 interviews were conducted in 2001, interviews for wave 2 occurred approximately one year later (2002/2003), with interviews for wave 3 (2004/2005) and wave 4 (2006/2007) following in two year intervals, and wave 5 (2011/2012) representing the most recent data collection. Retention rates from the first interview were 89.1 percent for the second interview, 84.4 percent for the third interview, 82.8 percent for the fourth interview, and 77.8% for the fifth interview. An advantage of multilevel modeling is that it allows for incomplete data on within-subject measures. Respondents who reported no dating partners over the five waves were eliminated from the analytic sample ( $n = 69$ ). Additionally, the youngest (12 years) and oldest (29 years) observations ( $n = 26$ ) were dropped as there were too few of these to include in the analyses. Finally, respondents with no valid data on the time-varying measures ( $n = 57$ ) were deleted. The final analytic sample ( $n = 1,164$ ) represents an 11-year accelerated cohort design with three overlapping cohorts covering a developmental period of ages 13 to 28 years.

Sixty-nine percent of respondents participated in every data collection interview. We conducted t-tests comparing mean IPV perpetration rates across the five waves for those missing versus those who had participated at any given wave, and found no significant differences. Further attrition analyses reveal that respondents with higher

participation rates are slightly younger, more likely to be female, and more likely to report drug and alcohol offenses at wave 1. Participation was not correlated with wave 1 scores of general antisocial behavior or depressive symptoms.

### Measures

Our primary interest is in change in IPV perpetration, and with the exception of gender we focused exclusively on time-varying factors. Each of our time-varying measures were assessed at all five waves. The multilevel regression approach described by Osgood (2005) provided the means to investigate not only how changes in risk factors corresponded to changes in IPV perpetration, but also the degree to which they could account for any age-related trends.

### *Dependent Variable*

*IPV perpetration* was assessed across all five waves by using four items from the Conflict Tactics Scale (Straus, 1979). Respondents were asked how often they committed the following acts against their current or most recent partner: “thrown something at him/her;” “pushed, shoved or grabbed him/her;” “slapped him/her in the face or head with an open hand;” and “hit him/her.” Responses were 1 (never), 2 (hardly ever), 3 (sometimes), 4 (often), and 5 (very often). Those responding “never” to all items were coded as 0, and others were coded as 1. The average alpha score across waves for this measure is .88.

### *Behavioral and Psychological Risk Factors*

We created two measures of antisocial behavior using 10 items adapted from the 26-item inventory by Elliot and Ageton (1980). Measure one, *general antisocial behavior*, consists of seven items assessing how frequently respondents engaged in theft (major and minor), breaking and entering, assault and battery, property damage, selling drugs, and carrying a hidden weapon. Due to the skewed response pattern (79.7% of observations are zero scores), we created a dichotomous measure such that respondents who reported never engaging in any of these behaviors were coded as 0 and 1 otherwise. The average alpha score for this scale across waves is .79. Measure two, *alcohol and drug use*, was assessed using a three-item mean scale of the frequency of drinking alcohol, using illegal drugs, and public drunkenness. This scale also demonstrated some skewness, but was sufficiently corrected by using the logarithm of the scale. The average alpha score for this scale across waves is .71. *Depressive symptoms* in the past week is measured using a 7-item modified version of the Center for

Epidemiological Studies' depressive symptoms scale (CES-D) (Radloff 1977). Respondents were asked how often each of the following statements was true during the past seven days: (1) "you felt you just couldn't get going"; (2) "you felt that you could not shake off the blues"; (3) "you had trouble keeping your mind on what you were doing"; (4) "you felt lonely"; (5) "you felt sad"; (6) "you had trouble getting to sleep or staying asleep"; and (7) "you felt that everything was an effort." Responses were 1 (never) to 8 (every day). This is a mean scale of the seven items with an average alpha score across waves of .85. Again, due to skewness we use the logarithm of the scale.

### *Relationship Risk Factors*

*Relationship type* assessed whether the current or most recent relationship reported by respondents was a dating, cohabiting or marital relationship with dating as the referent. *Partner retention* is a binary measure of whether the respondent had retained their partner between waves. *Gainful activity* was coded as 1 if the respondent was attending school or employed full-time. Respondents who were not engaged in either activity were coded as 0. *Children present in the household* was coded as 1 if the respondent reported having children and that the children were living in the residence, while those with no children, or children living outside the home were coded as 0. Finally, we include three measures of relationship quality. *Frequency of disagreements* was measured using a single item that ranged from 1 for never to 5 for very often. *Trust* was measured using a single item that asked respondents how much they agreed or disagreed that there were times that their partner could not be trusted. Responses ranged from 1 for strongly disagreed, to 5 for strongly agreed and were then reverse coded so that higher scores reflected higher levels of trust. *Jealousy* was assessed using a single-item that asked respondents how much they agreed or disagreed that they felt jealous when their partner was around the opposite sex.

### *Analytic Strategy*

For covariates to potentially explain the age-IPV relationship, they must vary with age. We begin with descriptive analyses that examine the variability of our time-varying measures by age. We conducted one-way ANOVAs using continuous age as our factor variable and report the f-statistics in our table of descriptive statistics. Our second set of analyses examined the relationship of IPV perpetration and age, behavioral and psychological risk factors, as well as the relationship context. Analyses examining trajectories of social phenomena over time may consider factors that distinguish one trajectory over another (between-subject), or factors associated with a change in the trajectory at the individual level (within-subject) (Osgood 2005). Each approach has the potential to yield

important information about trajectories of IPV across adolescence and young adulthood, but for the current analyses we focus on within-individual change. We begin by estimating a random effects model for our binary response. Similar to recent work examining the age-crime curve (Sweeten, Piquero, and Steinberg 2013), inclusion of time-varying measures allowed us to examine the extent to which behavioral and psychological risk factors explained the age trend in IPV perpetration, relative to relationship-specific factors. This is accomplished by comparing age coefficients in a base model (age and gender) to the age coefficients of a model with the time-varying explanatory variable(s) of interest. Little change in the age coefficients would reinforce theories of stability, the need for identifying latent risk factors, and a continuing focus on between-individual differences. Reductions in the age coefficients in the elaborated model, however, would suggest that the variable(s) of interest have accounted for some of the age-IPV relationship. This would not only challenge notions of stability or that changes simply reflect an “aging of the organism” (Gottfredson & Hirschi 1990), but also indicate a need to consider developmental changes and variations in the relationship context.

Although our outcome is binary, we estimated an unconditional means model, specifying the outcome as continuous, to obtain approximations of the variance at the between- and within-subject levels. These results indicated that 77.1% of the variance is within-subject (level one), while 22.9% of the variance is between-subject (level two), supporting our decision to focus on within-individual change. To differentiate between-subject effects from within-person change, we followed the procedure of group-centering our time-varying predictors as described in prior work (Horney, Osgood, & Marshall 1995; Allison 2005). That is, we transformed responses for each of our time-varying covariates into deviations from each individual’s mean as calculated across all periods of observation which are included at level one, while including a person-level mean for each time-varying predictor at level two. A primary advantage of this approach is that it yields fixed-effects estimates of the time-varying covariates in the model, minimizing the potential threat of unmeasured heterogeneity (Allison 2005). Estimation of an initial growth model indicated that growth was best captured through the inclusion of both a linear and quadratic age term, demonstrating an overall curvilinear pattern. Thus, our analyses to follow included both age and age-squared, with age centered at the youngest age of 13 years.

## **Results**

### Descriptive Results

Table 1 provides the means and percentages for the study variables by age and gender, as well as a grand mean calculation for comparison. To present results parsimoniously, we group age into four categories covering four years each. For male youths, IPV perpetration increased from 13% at 13-16 years to 20% at 17-20 years. This is followed by subsequent decreases at 21-24 years (16%) and 25-28 years (10%). The pattern for female youths is similar, but is consistently higher with a peak of 29% at ages 21-24 years. The age pattern for general antisocial behavior displayed a curvilinear pattern similar to the one for IPV perpetration among boys and young men increasing from 29% at 13-16 years to a peak of 33% at 17-20 years followed by decreases at 21-24 years (26%) and 25-28 years (29%). In contrast, female youths steadily decreased in antisocial behavior from a peak of 22% at 13-16 years to 6% at 25-28 years. It should also be noted that rates of general antisocial behavior among male youths were higher than their rates of IPV perpetration. Thus, discontinuities between general antisocial behavior and IPV perpetration emerged early in the analyses.

Consistent with the notion that romantic involvement is a developmental sequence, we can see a progression from dating to cohabiting and marital unions for both genders. By age 25-28 years, 34% of men were cohabiting and 22% were married, and 30% of women were cohabiting, with 34% married. We also observed increases in partner retention with 25% of men age 21-24 years retaining a partner compared to 13% of men ages 17-20 years. Similarly, partner retention rates increased from 20% for women ages 17-20 years, to 33% for women ages 21-24 years. Consistent with prior work, relationship qualities also demonstrated some degree of variability across age.

#### Growth Curve Results

Table 2 shows the results of our hierarchical generalized linear models. Data were pooled across gender, and included gender and interactions of age and gender. Model 1 presents the results for our unconditional growth models by gender. We used female as the reference so the coefficients for our age terms represented the effects of age for female youths. Both age and age-squared were significant, indicating a curvilinear relationship. While the effect for male and the gender interactions are not significant, this is because we have centered age at 13 years. If we centered our age terms to any age at 17 years or above, both gender and the interactions were significant. Thus, our results indicated that for ages 13 through 16 the risk for IPV perpetration was similar for adolescent boys and girls. By age 17, however, the trajectories of IPV perpetration for male and female youths diverged, with female

youths demonstrating a curve that was on average, higher than the curve for male youths. Figure 1 graphs the unconditional growth models by gender, illustrating these divergent growth curves.

Figures 2a and 2b provide comparisons of each unconditional growth model of IPV perpetration to an unconditional growth model of general antisocial behavior. Figure 2a shows that for male youths the trajectory for antisocial behavior is considerably higher relative to the trajectory for IPV perpetration, particularly during adolescence. Figure 2b shows that patterns of IPV perpetration and antisocial behavior among female youths were quite distinct from one another. While girls' risk for antisocial behavior is decreasing, the risk for IPV perpetration is increasing, and continues until its peak at approximately age 21, and then begins to decline. These patterns are reflected in the results in model 2 of the multilevel analyses. The coefficients for general antisocial behavior ( $b = .290, p < .05$ ) and depressive symptoms ( $b = .388, p < .01$ ) are both significant, demonstrating that an increase in either of these risk factors is associated with an increase in the odds of perpetrating IPV. With respect to age coefficients, however, there is little change. Results for male respondents showed that the linear age effect was reduced by 22% ( $b = .155, p < .05$ ), while the curvilinear effect for age was diminished by 18.8% ( $b = -.013, p < .01$ ), suggesting a flattening of the curve. Thus, while antisocial behavior and depressive symptoms each demonstrated a positive association with IPV perpetration, they account for only some of the age-IPV perpetration curve for young men, and virtually none of the age variation in IPV perpetration for young women. Consequently, to understand what is underlying the relationship between age and IPV perpetration, we moved beyond these traditional behavioral and psychological risk factors.

Model 3 presents the results for relationship risk factors. Transitions into cohabiting ( $b = .729, p < .001$ ) and marital unions ( $b = .783, p < .01$ ) were associated with a higher risk of IPV perpetration relative to being in a dating relationship. Additionally, increases in the frequency of disagreements ( $b = .629, p < .001$ ) and jealousy ( $b = .215, p < .001$ ) were associated with increased odds of perpetrating IPV, while an increase in trust ( $b = -.251, p < .001$ ) was associated with lower odds of IPV. Furthermore, introduction of relationship risk factors into the model reduced the linear age effect for female youths by 34.8% ( $b = .217, p < .01$ ), and the age-squared effect ( $b = -.018, p < .001$ ) by 14.3%. For male youths the linear age effect is reduced by 88.4% ( $b = .023, n.s.$ ) and the age-squared effect by 43.8% ( $b = .009, n.s.$ ). Thus, relationship factors accounted for more of the variation in IPV perpetration by age than the behavioral and psychological risk factors.

Model 4 provides the results for the full model. Once frequency of disagreements or trust is included in the model, the effect for depressive symptoms was no longer significant. This suggests that depressive symptoms may influence IPV indirectly due its association with frequency of disagreements and trust. When considering both sets of risk factors, the coefficients for age ( $b = .003$ ) and age-squared ( $b = -.007$ ) were reduced to virtually zero for male youths, thus accounting for nearly all of the variation in IPV perpetration. For female youths, the full model accounts for a total of 56.6% of the age variation from ages 13 to 20, and 31.2% of the age variation from ages 21-28. This is reflected in Figure 3, which graphs the original unconditional growth models by gender (model 1), and the conditional growth models (model 4) by gender. While the conditional growth model for female youths shows a substantial improvement over the unconditional model, further work remains in identifying the risk factors associated with change in female patterns of IPV perpetration.

Finally, we explored whether any of the time-varying variables interacted with gender to influence patterns of IPV perpetration. None of these interactions were statistically significant. This finding indicated that the risk factors operated in a similar manner for male and female youths. Furthermore, an examination of interactions with age revealed that interactions between frequency of disagreements and age, and age-squared were significant. Thus, the association of frequency of arguments and IPV perpetration demonstrated a curvilinear pattern similar to the IPV perpetration curve. Specifically, the association between frequency of arguments and IPV perpetration increased in strength during adolescence, demonstrating its strongest association during the late teens, and subsequently weakening during the twenties. None of the other variables interacted with age.

## **Discussion**

Scholars have argued that patterns of relationship violence follow patterns that parallel other forms of antisocial behavior. Researchers have demonstrated a fairly predictable pattern, referred to as the age-crime curve, in which crime peaks in the teens and then declines. We evaluated whether this curve also exists for intimate partner violence, while recognizing that male and female self-reports are quite distinct, with the well-known age-crime curve reflecting the male pattern of criminal behavior. In contrast, because prevalence rates of male-to-female IPV perpetration are not as divergent as delinquency patterns, we expected the age-IPV curve would be similar for young men and women. We included relationship risk factors, rather than simply relying on the traditional familial and socioeconomic factors that predict criminal involvement. Using a contemporary, diverse sample, we examined



patterns of IPV perpetration from adolescence to young adulthood. We demonstrated that the predicted probability of IPV perpetration reaches its peak in the early twenties and subsequently declines during the latter half of the twenties. While the risk of IPV perpetration was similar for adolescent boys and girls, the predicted probability of IPV perpetration was higher for female youths beginning at age 17 years and continuing to our oldest observed age of 28 years. The gender gap in reported IPV perpetration was highest during the peak period of the early twenties. While risk of IPV perpetration continued to be higher for women at age 28 relative to their male peers, the gender gap had narrowed considerably. Thus, further work examining patterns of IPV (perpetration and victimization) is needed to investigate how these patterns may change later in the life course.

Comparison of age-related patterns in IPV perpetration and general antisocial behavior revealed growth curves that were distinctive by behavior and gender. For female youths, risk of IPV perpetration increases even as their risk for antisocial behavior decreases. Thus, the trajectories of these two behaviors bear little resemblance to one another. While the shapes of the two curves were similar for male youths, the risk of antisocial behavior among male youths was considerably higher. As noted by Douglas and Straus (2006), partner violence perpetrated by men in the U.S. has significantly decreased in large part due to feminist-led efforts to shape social policy and raise public awareness. This is supported by recent findings (Simon, Ellwanger, & Haggerty 2010) that showed that jurisdictions with mandatory or preferred arrest policies had higher odds of making an arrest for domestic violence or violation of a protection order.

Multilevel analyses provided no evidence that antisocial behavior, alcohol and drug use, and depressive symptoms directly accounted for any of the age variation in IPV perpetration among female youths. These behavioral and psychological risk factors, however, did account for 22% of the linear age effect for male youths. Consequently, factors associated with changes in antisocial behavior, may also account for some change in IPV perpetration among boys and young men. Still, romantic relationship factors accounted for greater variation by age in IPV perpetration, decreasing the magnitude of the linear age effect for male youths by 88% and by 35% for female youths. These findings reinforce recent calls for prevention efforts that focus on the development of healthy relationships (Pepler 2012, Capaldi and Kim 2007). Once both sets of risk factors were considered, age coefficients for male youths were approaching zero suggesting that our models had effectively explained all of the age variation in IPV perpetration for boys and young men. Thus, further work is needed to identify additional factors associated with age-related patterns of IPV perpetration for girls and young women. One of the more robust findings within

criminology is that men are more violent than women when considering all forms of violence across contexts (Messner and Sampson 1991). Furthermore, gender differences emerge when considering victimology. While strangers are the victims of half (50.2%) of male-perpetrated violence, they constitute only about a quarter (28.4%) of female-perpetrated violence. In contrast, violence against an intimate only accounts for 2.5% of men's violent offenses, compared to 22.9% of those committed by women (Bureau of Justice Statistics 2010). Such findings highlight that the context of women's violence is likely to be situated closer to home, and underscores the utility of considering proximal risk factors such as those associated with the intimate relationship itself.

The current study is not without limitations. First, we did not distinguish between perpetrator only and bidirectional violence groups. Examination of the distribution of gender across these two groups revealed that the perpetrator only group was overwhelmingly female (90%). Accordingly, the lack of male respondents in the perpetrator only group precluded us from being able to conduct a gendered analysis by group. Given that consideration of gendered pathways was a central focus of the current study, we chose to pool respondents combining perpetration only and bidirectional violence reports for our analyses into a report of any perpetration experience. Additionally, we do not differentiate between same-sex and different-sex relationships due to the small number of respondents reporting on a same-sex relationship. Another potential limitation was our reliance on self-reported data. While critics of self-reported data from school-based samples often express concern over not including those most likely to engage in risky behaviors (Wills & Cleary 1997), an asset of the TARS is that respondents did not have to be in school in order to participate. Furthermore, as our attrition analyses indicated, IPV perpetration and general antisocial behavior was not associated with participation rates, while alcohol and substance use was actually *higher* among those retained in the sample. A further concern of self-reported data is a social desirability bias. However, official records such as hospital records, and arrest data are subject to their own biases, and comparisons of self-reports of problematic behaviors and official records has found a high degree of concurrent validity (Maxfield, Wieler, & Widom 2000). Additionally, the current study does not consider how patterns of change may vary based on prior victimization patterns. Prior work has highlighted that girls and women who experience early physical and sexual victimization are at greater risk for IPV involvement (Whitfield et al. 2003; Foshee et al. 2004). Accordingly, there is a need for greater understanding of how victimization experiences in other contexts (e.g., family, peers) influence patterns of IPV involvement in romantic relationships across the span of adolescence and young adulthood.

The differential findings for the influence of behavioral and psychological risk factors on the age variation of IPV perpetration, as well as the fact that much of the age variation for women remains unexplained, highlights the need for ongoing consideration of gendered pathways. It should be noted, however, that gender did not interact with any of our time-varying variables. Thus, the influence of general antisocial behavior, relationship type, and the relationship qualities on IPV perpetration was similar for both male and female youths in our full model. These results showcase the need to consider both generic and gendered processes.

The interaction between age and frequency of disagreements provides insight into relational processes associated with IPV. It seems reasonable that frequency of disagreements would follow a similar pattern to the overall age-IPV perpetration curve, and one might wonder whether frequency of disagreements and IPV perpetration are simply capturing the same overall trend of relationship conflict over time. While this may be the case, there are two considerations to keep in mind. First, while IPV perpetrators do report higher frequencies of disagreements ( $M = 3.2$ ) relative to non-perpetrators ( $M = 2.4$ ), frequency of disagreements among non-perpetrators displayed a high degree of variability, with 57% of those reporting frequency of disagreements 1 SD above the mean or higher being non-perpetrators. Therefore, frequent disagreements does not always equate to violence in the relationship. Second, the frequency of disagreements and age interactions reflects changes in the *association* between disagreements and IPV perpetration, not the absolute values of frequency of disagreements. This suggests that it is important to attend to not only changes in risk factors over time, but also changes in the strength of their association with IPV over time.

Nevertheless, as individuals age, there are opportunities for change. With respect to IPV, changes may reflect vagaries in other risk behaviors that alter risk profiles, or increases in stressors that translate to declines in psychological well-being. However, changes may also represent agentic choices on the part of individuals, such as partner selection (O'Leary & Slep 2012). Yet, to date, relatively few studies have considered changes in IPV perpetration across relationship contexts. This is an important next step given the considerable turnover in romantic partners during young adulthood (Arnett 2004) when, as indicated by our results, risk is at its peak. More work is needed that uses longitudinal data and includes not only developmental changes, but changes in the romantic context as well. Specifically, in addition to relationship qualities, dyadic patterns of interaction that include the partner need to be considered (Pepler 2012). Such efforts have the potential to yield much information with respect to how risk profiles develop and change over time and influence patterns of IPV involvement.

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Table 1. Means/Proportions and Standard Deviations of Analytic Sample by Age, Toledo Adolescent Relationships Study (TARS) (n = 1,164 respondents, 4,458 observations)

	Male Youths				F	Female Youths				F	Grand Mean	Range
	13 – 16 (31%)	17 – 20 (41%)	21 – 24 (16%)	25 – 28 (12%)		13 – 16 (30%)	17 – 20 (41%)	21 – 24 (18%)	25 – 28 (12%)			
Age	14.80 (1.10)	18.36 (1.10)	22.40 (1.00)	26.40 (1.10)		14.80 (1.10)	18.40 (1.10)	22.30 (1.00)	26.50 (1.10)		18.90	13 – 28
IPV Perpetration	0.13 (0.33)	0.20 (0.40)	0.16 (0.37)	0.10 (0.30)	6.26***	0.20 (0.40)	0.23 (0.42)	0.29 (0.46)	0.17 (0.38)	6.60***	0.20	0 – 1
<i>Behavioral and Psychological Factors</i>												
General Antisocial Behavior	0.29 (0.46)	0.33 (0.47)	0.26 (0.44)	0.20 (0.40)	6.49***	0.22 (0.42)	0.17 (0.37)	0.11 (0.32)	0.06 (0.24)	18.37***	0.22	0 – 1
Alcohol and Substance Use	0.29 (0.47)	0.74 (0.63)	1.14 (0.55)	1.13 (0.58)	280.27***	0.31 (0.45)	0.67 (0.57)	0.93 (0.54)	0.95 (0.55)	189.44***	0.73	0 – 2.2
Depressive Symptoms	0.69 (0.43)	0.74 (0.47)	0.76 (0.46)	0.75 (0.46)	2.88*	0.82 (0.46)	0.81 (0.47)	0.79 (0.48)	0.74 (0.49)	2.32 <sup>†</sup>	0.76	0 – 2.1
<i>Relationship Risk Factors</i>												
Relationship Type					329.60***					402.17***		
Dating	1.00 (0.00)	0.94 (0.24)	0.69 (0.46)	0.44 (0.50)		1.00 (0.00)	0.88 (0.32)	0.59 (0.49)	0.36 (0.48)		0.81	0 – 1
Cohabiting	0.00 (0.00)	0.00 (0.00)	0.08 (0.27)	0.22 (0.41)		0.00 (0.00)	0.10 (0.30)	0.28 (0.45)	0.30 (0.46)		0.13	0 – 1
Married	0.00 (0.00)	0.00 (0.00)	0.08 (0.27)	0.22 (0.41)		0.00 (0.00)	0.01 (0.12)	0.13 (0.34)	0.34 (0.47)		0.07	0 – 1
Partner Retention	0.03 (0.18)	0.13 (0.34)	0.25 (0.43)	0.26 (0.44)	55.20***	0.05 (0.22)	0.20 (0.40)	0.33 (0.47)	0.34 (0.47)	73.28***	0.20	0 – 1
Gainful Activity	0.99 (0.07)	0.76 (0.43)	0.69 (0.46)	0.71 (0.45)	94.14****	0.99 (0.10)	0.75 (0.43)	0.63 (0.48)	0.66 (0.48)	117.49***	0.79	0 – 1
Children in Household	0.00 (0.00)	0.04 (0.19)	0.13 (0.34)	0.28 (0.45)	109.50***	0.01 (0.10)	0.12 (0.33)	0.37 (0.48)	0.47 (0.50)	197.67***	0.14	0 – 1
Frequency of Disagreements	2.15 (0.92)	2.55 (1.01)	2.73 (0.97)	2.74 (0.87)	38.32***	2.32 (1.05)	2.63 (0.99)	2.73 (0.97)	2.73 (0.97)	20.02***	2.55	0 – 1
Trust	3.76 (1.07)	3.74 (1.16)	3.93 (1.09)	4.16 (1.09)	11.71***	3.63 (1.19)	3.74 (1.23)	3.81 (1.28)	3.98 (1.25)	5.63***	3.80	1 – 5
Jealousy	2.48 (1.08)	2.81 (1.12)	2.60 (1.14)	2.47 (1.16)	12.87***	2.75 (1.17)	2.86 (1.15)	2.68 (1.20)	2.45 (1.15)	10.71***	2.69	1 – 5

Note: Standard deviations are in parentheses

<sup>†</sup> p < .10, \* p < .05, \*\* p < .01, \*\*\* p < .001

Table 2. Hierarchical Generalized Linear Model for IPV Perpetration across Adolescence and Young Adulthood (N = 1,164 subjects, 4,458 observations)

	Model 1		Model 2		Model 3		Model 4	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Age (centered age 13)	.333***	.061	.347***	.063	.217**	.069	.229***	.072
Age <sup>2</sup>	-.021***	.004	-.022***	.004	-.018***	.004	-.018***	.004
Male	.018	.318	.053	.317	.549	.338	.459	.337
Male x Age	-.134	.093	-.192*	.093	-.194	.100	-.226*	.100
Male x Age <sup>2</sup>	.005	.006	.009	.006	.008	.007	.010	.007
<i>Behavioral and Psychological Risk Factors</i>								
General Antisocial Behavior			.290*	.138			.305*	.151
Alcohol and Drug Use			.045	.117			.012	.131
Depressive Symptoms			.388**	.137			.073	.154
<i>Relationship Risk Factors</i>								
Relationship Status								
(Dating)								
Cohabiting					.729***	.180	.727***	.181
Married					.783**	.281	.720*	.284
Partner Retention					.077	.149	.081	.149
Gainful Activity					.118	.140	.137	.141
Children in Household					.045	.200	.072	.200
Frequency of Disagreements					.629***	.067	.625***	.067
Trust					-.251***	.053	-.245***	.053
Jealousy					.215***	.058	.219***	.058
Constant	-2.649***	.223	-3.782***	.290	-2.320***	.667	-2.829***	.675

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

Note: Between-subject effects are included in the model but not shown.

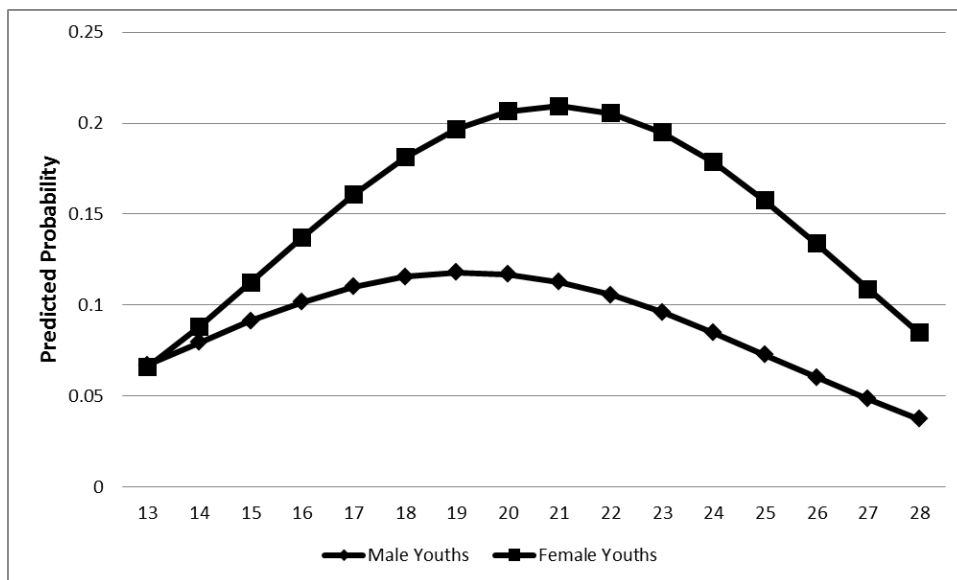


Figure 1. Age curve for IPV perpetration by gender from age 13 to 28.

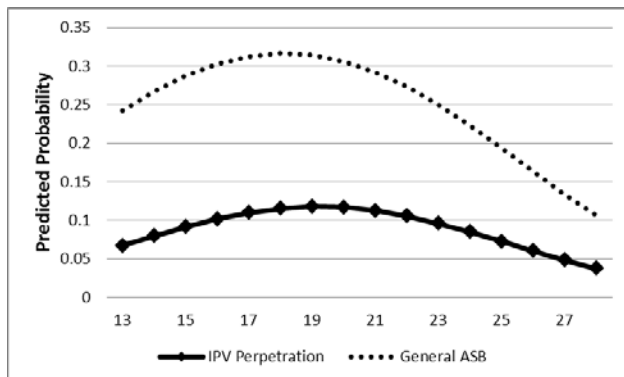


Figure 2a. Age curves of IPV perpetration and general antisocial behavior for male youths from age 13 to 28.

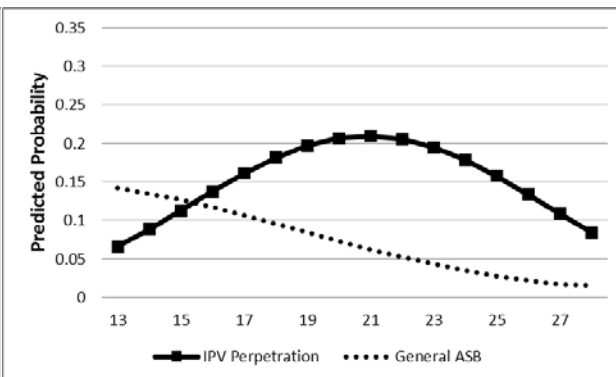


Figure 2b. Age curves of IPV perpetration and general antisocial behavior for female youths from age 13 to 28.

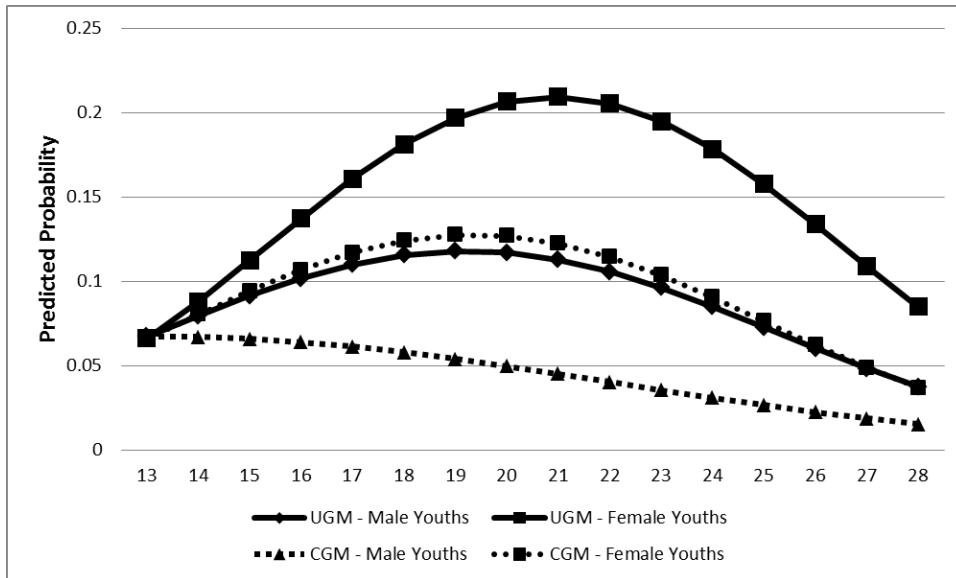


Figure 3. Age curves for unconditional (UGM) and conditional growth models (CGM) of IPV perpetration by gender from age 13 to 28.