



# Synergistic Effects of Depression and Poor Impulse Control on Physical Partner Violence; A National Study in the United States

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## Abstract

**Background and aims:** Although major depressive disorder (MDD) also increases the risk of intimate partner violence (IPV) perpetration, poor mental health has been mostly conceptualized as a consequence of IPV victimization rather than a risk factor for IPV perpetration. Poor impulse control is another IPV risk factor. Building on a risk/risk framework, this study investigated additive and multiplicative effects of male partners' MDD and poor impulse control on physical IPV victimization reported by female partners.

**Methods:** This national longitudinal study followed a random sample of 2500 male and female cohabiting partners for 2 years in the United States. Data came from the Fragile Families and Child Wellbeing Study (FFCWS). Male partner's MDD was the independent variable. Baseline socio-demographic factors (age, relation status, education level, income, and minority status) and generalized anxiety disorder (GAD), and Alcohol Use Disorder (AUD) were covariates. Outcome was female partner's physical IPV victimization measured at baseline and 2 years later. Male partner's impulse control was the moderator. *Model I* tested independent effects of MDD and impulse control on physical IPV. *Model II* used multi-group structural equation model to test the effect of MDD in those with low and poor impulse control. All participants provided written consent. SPSS and AMOS were used for data analysis.

**Results:** *Model 1* that tested additive effects of socioeconomic status (SES), GAD, AUD, MDD, and poor impulse control did not show main effects of MDD or impulse control on an increase in perpetration of physical IPV over 2 years. *Model 2* showed that MDD predicts an increase in perpetration of physical IPV by men with poor impulse control, but not men with high impulse control.

**Conclusion:** Based on the findings, poor impulse control and MDD have synergistic effects on IPV committed by men. Given the synergistic effects of psychological determinants of IPV, there is a need for prevention of IPV in male partners who have multiple risk factors such as MDD and poor impulse control. Self-regulation trainings of depressed men with poor impulse control may reduce IPV risk among men.

**Keywords:** Physical intimate partner violence, Impulse control, Major depressive disorder

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Received: 1 August 2017  
Accepted: 8 October 2017  
ePublished: 28 October 2017



## Introduction

Most previous studies have conceptualized depression as a consequence not a risk factor for intimate partner violence (IPV).<sup>1,2</sup> Depression, however, may increase the risk of IPV perpetration, as well.<sup>3,4</sup> Depression may predict IPV perpetration, independent of alcohol use disorder (AUD) and illicit drug use.<sup>3</sup> In a study of about 2000 males and females between ages of 15 and 26, high depressive symptoms of men predicted IPV (adjusted odds ratio [AOR] = 1.50) and rape (AOR = 1.81) perpetration.<sup>5</sup> In a national household sample of American couples, high depressive symptoms

increased risk of male-to-female and female-to-male IPV perpetration.<sup>6</sup>

Among women, depression may more strongly correlate with IPV victimization than perpetration.<sup>7</sup> Among men, however, depression may be a stronger predictor of IPV perpetration than victimization.<sup>7</sup> Although severe depression is linked to both one-sided and bidirectional aggression, depression has a stronger link to one-sided aggression.<sup>7</sup> Most of these studies, however, have done a cross-sectional study. More longitudinal research is needed on depression as a potential risk factor for IPV perpetration.

Poor impulse control also increases a wide range of violent and aggressive behaviors.<sup>8-10</sup> Based on a study in California, high impulse control was associated with high rates of IPV, net of other risk factors such as problem drinking.<sup>11</sup> Researchers have argued that disinhibition and poor impulse control may be a mechanism by which psychiatric disorders increase risk of partner violence.<sup>12</sup>

Unfortunately, very few studies – if any – have tested multiplicative effects of poor impulse control and psychiatric disorders such as major depressive disorder (MDD) on IPV. We believe MDD and impulse control may have synergistic effects as IPV risk factors.<sup>12</sup> Most previous studies have tested additive effects of impulse control and mental health problems.<sup>13-15</sup> There is still a need to study multiplicative effects of risk factors of IPV.

Built on a risk/risk framework, this study studied how men's poor impulse control, MDD, and AUD interact in predicting perpetration of physical IPV over time. Similar to the risk and resilience model,<sup>16-18</sup> risk/risk model suggests that there is a need to study multiple risk and positive factors. Risk/risk framework suggests that the effect of one risk factor on the negative outcome may depend on the presence or absence of other risk or protective factors.<sup>19</sup> Based on this framework, while resilient factors potentially interrupt paths from risk factors to undesired outcomes, presence of other risk factors may exacerbate their effects.<sup>20</sup>

There are 2 strategies to study risk-risk frameworks.<sup>20</sup> In *Model 1*, risk factors operate independent of other risk factors. This model measures the additive effects of multiple risk factors.<sup>21</sup> In *Model 2*, the second risk factor moderates the effect of first risk factor on outcome.<sup>22</sup> This model conceptualizes a multiplicative effect among various risk factors.<sup>23</sup>

Although risk-risk frameworks have been previously applied to study IPV perpetration, we could not find any previous study considering the multiplicative effects of MDD, AUD, and poor impulse control on physical IPV perpetration. As mentioned earlier, most of our knowledge in this area comes from cross sectional studies. Using a longitudinal design and national sample, we tested additive and multiplicative effects of MDD, AUD, and poor impulse control of male partner on changes in physical IPV reported by other partner over time.

## Methods

### Design and Setting

This study used data from waves 2 and 3 of Fragile Families and Child Wellbeing Study (FFCWS), a national population-based longitudinal study that

started in 1998 in the United States.

The study used a random national sample. Participants were male and female partners who were selected from 20 US cities with populations of 200 000 or more. The cities were chosen by a stratified random sampling method to maximize cross city variation in economic and politic environments. Baseline data collected consisted of 4898 families selected from 75 hospitals across 20 cities. From this number, 3712 couples were unmarried and 1186 couples were married. More information regarding the FFCWS sampling strategy and interview protocol is available elsewhere.<sup>24</sup>

Data was collected during core interviews and the add-on In-Home Longitudinal Study of Pre-School Aged Children. Participants were interviewed at baseline (near the time of the target child's birth) and again at 1 (Wave 2, child age 1) and 3 (Wave 3, child age 3) following birth. As an add-on to the core interview, a subset of mothers (n = 3288) participated in the In-Home Study when the index child was 3 years old; male partners were not eligible to participate in the In-Home Study.

FFCWS has oversampled non-married couples.<sup>24</sup> As non-marital unions are at greater risk for relationship instability, a large number of male partners were not living with the mother in waves 2 or 3. For instance, by the time the study target child was 3 years old, less than half of male partners resided in the home with the female partner.

### Measures

Most variables were based on male partner's self-report; female partner's report was used when male partner's report was unavailable or inappropriate to use. Male-to-female interpersonal violence was based on female partner's self-report.

### Outcomes

*Female partner's victimization of physical IPV.* Physical IPV was assessed by asking mothers 2 questions, on a 3-point scale (“never”, “sometimes”, or “often”), regarding how often fathers carried out behaviors toward the mother, (e.g., slapping, kicking, hitting) which were adopted from the Conflict Tactics Scale (CTS-2) for adults.<sup>25,26</sup> The original and revised CTS<sup>25,26</sup> have been the most commonly used research measures of domestic violence. Version 1996 measures psychological dimensions, physical violence, sexual violence, and financial control.<sup>27</sup>

### Predictors

*Major Depression.* The Composite International

Diagnostic Interview - Short Form (CIDI-SF), Section A<sup>28</sup> was used to measure major depression disorder. The CIDI-SF is a standardized instrument that is consistent with the criteria set forth in the Diagnostic and Statistical Manual of Mental Disorders – Third Edition – Revised (DSM-III-R).<sup>29</sup> This instrument has good reliability and validity.<sup>28</sup> The CIDI-SF uses the criteria set forth in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) to determine the probability that the respondent would be diagnosed with major depression if given the full CIDI interview. Major depression is indicated by feelings of depression or anhedonia experienced for most of the day, every day, for at least 2 weeks. Participants were classified as likely to have major depression if they endorsed the screening items and 3 or more depressive symptoms (e.g., losing interest, feeling tired, change in weight) (0 = no, 1 = yes).

*Major Depression and Generalized Anxiety Disorder (GAD).* The CIDI-SF was used to measure GAD.<sup>28</sup> This diagnosis is based on DSM-III-R (American Psychiatric Association, 1994). CIDI-SF has good reliability and validity.<sup>28</sup> GAD is defined as 6 months or more of feeling excessively worried or anxious about more than one thing, more days than not, and having difficulty controlling their worries. Some of the common symptoms include being keyed up or on edge, irritability, restlessness, having trouble falling asleep, getting tired easily, difficulty concentrating and tense or aching muscles. Individuals were classified as having GAD if they met full DSM-III-R diagnostic criteria (0 = no, 1 = yes).

*Alcohol Abuse.* Heavy alcohol use was defined as 4 or more drinks (coded “1”) or 0-3 drinks (coded “0”) consumed in a single day in the past 12 months. This measure reflects the National Institute on Alcohol and Alcoholism (NIAAA) definition of heavy drinking days,<sup>30</sup> defined as 5 or more drinks in a single day for men.

*Covariates.* Control variables which were measured at baseline interview (Wave 1) included education level (1 = less than high school, 2 = high school degree or GED, 3 = some college/technical school or higher), age, income, minority status, and relationship status (1 = married, 2 = cohabiting, 3 = not married or cohabiting). Demographic variables (marital status, family income) and psychosocial variables (depression, alcohol abuse, anxiety) were measured at Wave 2, when the child was 1 year old.

### Analysis Plan

We used PASW 20.0 (SPSS Inc, Chicago, IL) for our univariate and bivariate analysis. We used independent

samples *t* test to compare impulse control, IPV, and control variables among those with and without depression, and anxiety. We also used Pearson correlation test for bivariate associations between IPV, impulse control, frequency of alcohol use and also control variables.

We used AMOS (SPSS Inc, Chicago, IL) for our multivariable analysis. We run 6 different structural equation models based on the type of IPV and IPV time point: (1) physical aggression at baseline, (2) physical IPV 2 years after baseline, (3) change in physical IPV from baseline to the next 2 years, (4) psychological IPV at baseline, (5) psychological IPV 2 years after baseline, and (6) change in psychological IPV from baseline to 2 years later.

In *Model 1*, after controlling for anxiety, and alcohol, and SES, we tested paths from depression and impulse control to IPV. We also tested *Model 2* that tested the effect of depression on IPV in 2 groups of participants based on impulse control (Figure 1 and Figure 2).

The chi-square test, comparative fit index (CFI), chi-square to degree of freedom ratio, and also root mean square error of approximation (RMSEA) were considered as fit indices. A CFI of higher than 0.95, RMSEA of lower than 0.06, and chi-square test to degree of freedom ratio less than 2 were indicative of good fit.<sup>31</sup> Variables measured at baseline did not have missing values. Variables measured at Wave 2 had less than 10% of missing value.

### Results

Only 37.8% (n = 944) of couples were married at the time of survey. From all, 73% (n = 1836) of male and 71% (n = 1778) of female partners belonged to minority groups. By the means of race, 38% (n = 944) of male and 36% (n = 888) of female partners were African American, while 31% of male (n = 774) and 33% (n = 777) of female partners were Hispanic.

Mean household income was \$39 720 with a standard deviation of \$35 436. Mean age of male partners were 28 ± 7, with a range of 15-43 years. Mean and range of age of female partners were 26 ± 6 and 16-53 years, respectively (Table 1).

Four point six percent of male partners (n = 115) endorsed depression criteria at year 1 (CIDI). One percent of male partners (n = 25) met anxious criteria at year 1 (CIDI). Majority of male partners (65%, n = 1627) reported drinking alcohol during the past 3 months, while 36% (n = 901) reported more than 3 drinks in 1 day (Table 2).

At year 1, 44% (n = 1,089) and 2% (n = 44) of mothers reported they experienced some degrees of psychological and physical IPV, respectively.

**Table 1.** Descriptive Statistics of Male and Female Partners Included in This Study (2500 Couples Who Were Either Married or Cohabiting at Baseline)

	n	Min	Max	Mean	SD
<b>Household</b>					
Household income	2500	0.00	133750	39720.92	35436.40
<b>Male partner</b>					
Male partner's age (y)	2292	16.00	53.00	28.73	7.00
Impulse control	1889	6.00	24.00	11.46	3.79
<b>Female partner</b>					
Female partner's age (y)	2500	15.00	43.00	26.25	6.12
Physical IPV at baseline	2486	0.00	4.00	0.02	0.22
Physical IPV at follow-up	1946	0.00	4.00	0.02	0.24
Change in victimization of physical IPV	1936	-2.00	4.00	0.00	0.26

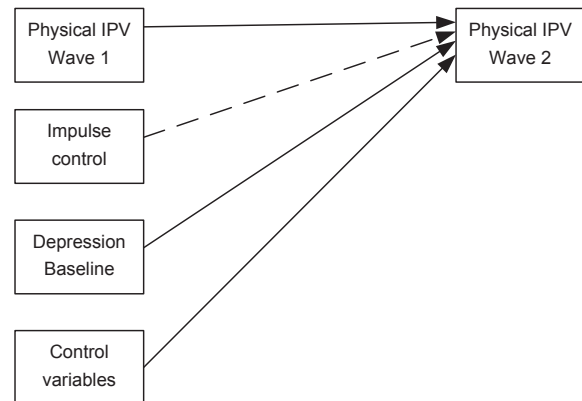
Two years later, 34% (n=837) and 1% (n=33) of mothers reported that they experienced some degrees of psychological and physical IPV, respectively. Descriptive statistics of physical and psychological IPV at baseline and follow-up and their difference are reported in Table 2.

Our bivariate analysis did not show any direct association between depression and physical IPV at baseline, 2 years later, or their difference (Table 3).

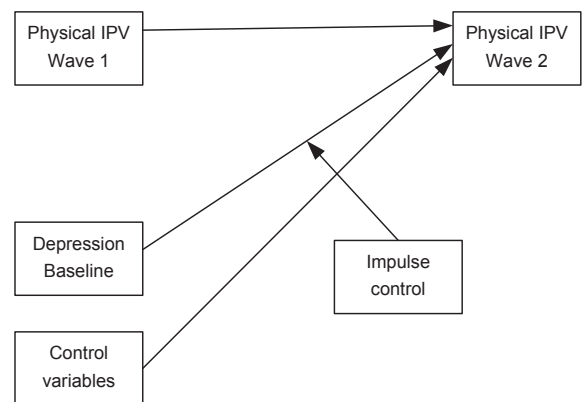
**Table 2.** Characteristics of Male and Female Partners Enrolled to This Study

Characteristics	n	%	% Valid
<b>Female partner</b>			
<b>Minority</b>			
No	716	28.6	28.7
Yes	1778	71.1	71.3
<b>Male partner</b>			
<b>Minority</b>			
No	660	26.4	26.4
Yes	1836	73.4	73.6
<b>Education</b>			
Less than high school	710	28.4	28.4
High school or equivalent	794	31.8	31.8
Some college	583	23.3	23.3
College or higher	393	15.7	15.7
<b>Anxiety</b>			
No	2181	87.2	98.9
Yes	25	1	1.1
<b>Depression</b>			
No	2092	83.7	94.8
Yes	115	4.6	5.2
<b>Drinking</b>			
Never	663	26.5	29
Once a month	675	27	29.5
Several occasions a month	619	24.8	27
Several occasions a week	256	10.2	11.2
Daily	77	3.1	3.4
<b>More than 3 drinks in a day</b>			
No	1385	55.4	60.6
Yes	901	36	39.4

**Change in Physical IPV From Baseline to 2 Years Later**  
 Based on a model with excellent fit indices [ $\chi^2 = 520.310$ ,  $df = 130$ ,  $P < .001$ ,  $CFI=0.973$ ,  $CMIN/DF = 4.002$ ,  $RMSEA = 0.035$ ,  $90\% CI = 0.035-0.038$ ],



**Figure 1.** Diagram of Structural Equation Model Testing *Model 1*. Based on this model, after controlling physical intimate partner violence perpetration at baseline, SES, baseline general anxiety disorder (GAD), alcohol use disorder (AUD), and impulse control, major depressive disorder (MDD) was not correlated with physical intimate partner violence 2 years later. Dotted path is non-significant.



**Figure 2.** Diagram of Structural Equation Model Testing *Model 2*. Based on this model, major depressive disorder (MDD) was only associated with perpetration of physical IPV among men with poor impulse control, but not men with high impulse control. That means impulse control moderates the effect of depression on physical aggression 2 years later.

**Table 3.** Correlation Between Baseline Variables and Physical Intimate Partner Violence

	1	2	3	4	5	6	7	8	9	10	11	15	16	17
1 Household income		-.33**	-.39**	.40**	.32**	.49**	-.03	-.04	.032	.04	.17**	-.05**	-.05*	-.01
2 Minority father			.79**	-.19**	-.17**	-.30**	.01	-.01	-.058**	-.09**	-.03	.06**	.03	-.01
3 Minority mother				-.25**	-.19**	-.34**	-.00	-.01	-.065**	-.09**	-.03	.06**	.05*	.01
4 Mother age					.75**	.35**	.03	-.05*	.060**	-.01	.14**	-.02	-.01	-.01
5 Father age						.36**	.02	-.01	.044*	-.03	.12**	-.03	-.01	.01
6 Father education							-.02	-.05*	.016	.00	.24**	-.05**	-.04	.01
7 Anxiety								.24**	-.016	-.020	-.08**	-.01	-.01	-.00
8 Depression									-.015	-.015	-.16**	-.03	.02	.03
9 Alcohol frequency										.57**	-.06**	.05*	.06*	.02
10 Alcohol more than 3 drinks											-.06**	.06**	.00	-.03
11 Impulse control												-.04	-.03	-.01
15 Physical IPV baseline													.27**	-.44**
16 Physical IPV follow-up														.74**
17 Change in physical IPV														

while baseline physical IPV, socioeconomic status (SES), GAD, AUD, and MDD were also in the model, impulse control was not associated with change of physical IPV over the 2-year follow-up.

Based on a model with excellent fit indices [ $X^2 = 520.310$ ,  $df = 130$ ,  $P = .000$ ,  $CFI=0.913$ ,  $CMIN/DF = 3.922$ ,  $RMSEA = 0.032$ ,  $90\% CI = 0.032-.037$ ] which had SES, baseline physical IPV, anxiety, and AUD in the model, MDD was only associated with change in physical IPV among individuals with poor impulse control. Such association was not found between individuals with high impulse control.

## Discussion

Based on our analysis, impulse control and MDD did not have main effects on the change in risk of perpetration of physical IPV, while the effects of SES, AUD, and HAD were controlled. However, poor baseline impulse control and MDD had synergistic effects on changes in physical IPV over time. That said, only depressed men with low impulse control showed an increase in physical IPV over time. National sample, large sample size, longitudinal design, and considering SES, MDD, GAD, and AUD as predictors of IPV all should be considered as strengths of this study.

Based on our findings, the effects of poor impulse control and depression on future change in perpetration of physical IPV are not additive but multiplicative. Poor impulse control increases rapid and unplanned reactions to internal or external stimuli without considering the negative consequences of such rapid reactions.<sup>32</sup> Impulse control also is low sensitivity to *negative* consequences of behaviors and

reactions to stimuli before complete processing of information.<sup>32</sup> Impulsivity reduces attention to long-term consequences of own behaviors.<sup>32</sup> Poor impulse control is a stable personality trait, a propensity to emit a certain response to stimuli.<sup>33</sup>

In 1988, Zuckerman et al introduced a personality dimension composed of traits such as impulsivity, sensation seeking, and anti-sociality and named it as behavioral under-control. In an 11-year longitudinal study of 489 young adults, behavioral under-control predicted relationship aggression net of gender, marital satisfaction, family history of AUD, and drinking patterns.<sup>34</sup> Zuckerman (1993) argued that aggression, conduct disorder, and criminality which are associated with both heavy drinking<sup>35</sup> and the risk of AUD<sup>36</sup> may be in fact dis-inhibitory behaviors.

From a biological perspective, the link between AUD and IPV perpetration has been attributed to psychopharmacologic influence of alcohol on brain, cognitive processing, and lack of inhibitions. AUD reduces inhibitory effect of prefrontal cortex, specifically the orbital and ventromedial PFC, which has implication for behavioral control of impulsive aggression.<sup>37,38</sup> It has been shown that AUD + participants with IPV have more severe deficits in tasks of impulse control, attention, concentration, and cognitive flexibility compared to controls.<sup>39</sup> They argued that understanding how impulse control and related neurocognitive deficits in AUD leads to IPV may improve effective treatments and preventions. Future research should also test if impulsiveness, attention, concentration, and cognitive flexibility mediate the link between mental health and IPV



perpetration.<sup>39</sup> Other types of IPV should also be included in future research.

The findings presented in this study have implication for prevention of male to female physical IPV. Although both genders use violent behaviors against their partners, male perpetrator/female victim is a common type of IPV.<sup>40</sup> Based on World Report on Violence and Health, between 10% and 69% of women in the community setting have experienced physical abuse during their lifetime.<sup>41</sup> In a community sample of adult women in the United States, 29% have experienced physical violence, rape, and/or stalking by an intimate partner, 24% have been a victim of severe physical violence by a partner, and 15% have been injured as a result of IPV in their lifetime.<sup>42,43</sup> The rate of severe physical aggression victimization among US women reported in the National Comorbidity Survey was reported low (to 6.5%).<sup>44</sup> Based on US Department of Justice, The Federal Bureau of Investigation (FBI, 2011), about 100 women are murdered by IPV each year.<sup>45,46</sup>

Our finding is limited to physical IPV, and future research should be conducted on other types of IPV. Different types of violence tend to co-occur in some relations.<sup>47</sup> We can hypothesize that the interaction between MDD and impulse control may vary based on the type of IPV. Although some studies have shown that the pattern of risk factors may be mostly the same for different IPV types,<sup>48</sup> there are studies which have reported different types of IPV may be different in their risk factors. For instance, a study<sup>49</sup> showed that anxiety predicted physical aggression perpetration but not perpetration or victimization of verbal aggression. In 2012, Basile and Hall argued that there is a need for future studies to better understand how distinct risk factors affect perpetration of various types of IPV by men.<sup>50</sup>

Our findings suggest that MDD and impulse control should be jointly evaluated and addressed for the treatment of physical IPV among men. Men with MDD may largely benefit from self-regulation trainings and impulse control enhancement. Joint interventions for impulse control and MDD should be regarded an important part of treatment of male perpetrators of physical IPV. Screening of impulse control and MDD among male IPV perpetrators may identify individuals that can benefit from such combined interventions. Future research should test efficacy of such approach for treatment of male IPV perpetrators.

To conclude, poor impulse control and MDD have synergistic effects on change in IPV perpetration by men. Further future research is needed in this regard.

## Ethical Approval

All study procedures were approved by Institutional Review Board Committees at Princeton University and Columbia University. Verbal and written informed consent was obtained from participants at each interview, and all participants were compensated for their involvement in the study.

## Conflict of Interest Disclosures

None.

## Funding/Support

Shervin Assari is supported by the Heinz C. Prechter Bipolar Research Fund and the Richard Tam Foundation at the University of Michigan Depression Center.

## Acknowledgment

The author thanks the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) for the grants R01HD36916, R01HD39135, and R01HD40421, as well as a consortium of private foundations for their support of the FFCWS.

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**How to cite the article:** Assari S. Synergistic effects of depression and poor impulse control on physical partner violence; a national study in the United States. *Int J Epidemiol Res*. 2017; 4(4): 232-239. doi: 10.15171/ijer.2017.09.