2023

EXAMINING THE MODERATING ROLE OF EXECUTIVE FUNCTIONING ON FLOODING AND INTIMATE PARTNER VIOLENCE

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A thesis submitted in partial fulfillment
of the requirements for the degree of

MASTER OF ARTS

to the faculty of the

DEPARTMENT OF PSYCHOLOGY

of

ST. JOHN'S COLLEGE OF LIBERAL ARTS AND SCIENCES
at
ST. JOHN'S UNIVERSITY
New York
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Date Submitted_____ Date Approved_____

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ABSTRACT

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Gabriella Damewood

Intimate partner violence (IPV) is highly prevalent, so much so that it has been described as a global public health crisis. Therefore, it is important to elucidate what conditions increase risk for IPV to better understand its etiology. Research emphasizing dyadic and self-regulatory processes may shed light on what differentiates those who perpetrate IPV. Specifically, both emotional flooding and executive functioning (EF) deficits have been implicated with IPV, but it is unclear how these variables may interact in predicting dating aggression. The current study explored how emotional flooding may differentially amplify risk for IPV under varying levels of executive functioning (comprised of inhibition, cognitive flexibility, and working memory). A total of 105 participants completed task measures of EF and self-report questionnaires on flooding, physical, and psychological aggression. Results found that flooding was significantly associated with psychological, but not physical aggression. EF was not associated with physical or psychological aggression. Moderation analyses were nonsignificant, and implications of null findings are discussed.

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Introduction

Intimate partner violence (IPV) is highly prevalent (Breiding, Chen, & Black, 2014; Tjaden & Thoennes, 2000) so much so that it has been described as a global public health crisis (Ellsberg 2006; Sardinha et al., 2022). IPV is characterized by an act that causes physical or psychological harm within an intimate relationship (Dokkedahl et al., 2019). Concerningly, the greatest risk for victimization is between ages 18-24 (Walters et al., 2010). For example, one study found that 40% of respondents reported experiencing IPV by young adulthood (Halpern et al., 2009). Furthermore, IPV has an array of physical and mental health sequelae ranging from chronic pain and diseases, gastrointestinal disorders, substance use disorders, depression, posttraumatic stress disorder, and suicide (Sugg, 2015). Thus, it is important to elucidate what conditions increase risk for IPV to better understand its etiology.

Research emphasizing dyadic and self-regulatory processes may shed light on what differentiates those who perpetrate IPV. There is consistent evidence that individual-level variables are associated with IPV (for meta-analytic reviews see Birkley & Eckhardt, 2015; Norlander & Eckhardt, 2005). Fewer studies explore the interpersonal context of an individual's *response* to their partner's negative affect or aversive behavior, and how that may increase the likelihood of aggression. One such factor, emotional flooding, has been implicated as a predictor of IPV (Malik et al., 2020; O'Leary, et al., 2007). Understanding dyadic-level factors such as flooding may shed light on a missing piece of how conflict can escalate to IPV. However, not everyone who experiences flooding will ultimately engage in IPV. Those with weaker self-regulatory abilities may be less able to manage the experience of flooding and be less effective at controlling

automatic responses during the heat of conflict, increasing the risk of engaging in IPV. Specifically, poor executive functioning is implicated with IPV in samples of batterers (for review see Horne et al., 2020; Humenik et al., 2020) and may be an important self-regulatory factor in whether flooded individuals resort to escalating conflict or are able to "put on the brakes" (Holley et al., 2017). Although flooding and executive functioning are both associated with IPV (Horne et al., 2020; Malik et al., 2020; O'Leary, et al., 2007), it is unclear how these variables may interact in predicting dating aggression. Thus, the current study sought to explore how emotional flooding may differentially amplify risk for IPV under varying levels of executive functioning.

Flooding and Aggression

Flooding has been consistently associated with IPV in the literature (O'Leary, et al., 2007; Malik et al., 2020). In couples contexts, flooding is defined as the experience of one's partner's negative affect or behavior as unexpected, intense, overpowering, and disorganizing (Gottman, 1993). Theory suggests that flooding is aversive in nature, and the flooded individual will do anything to "escape" the perceived aversive stimuli from their partner (Gottman, 1993; Mence et al., 2014). Furthermore, theory suggests that flooding disrupts cognitive processes used for problem-solving (Gottman, 1993). There is some preliminary evidence to support this, as couples who reported high levels of flooding were less effective at problem-solving during a conflict discussion task (Malik et al., 2019). Thus, the flooded individual's cognitive impairment may hinder an organized response, and the individual may rely on automatic, overlearned, or "easier-to-enact" responses (i.e., aggression) to terminate the aversive experience of flooding during conflict (Lorber et al., 2016; Malik et al., 2020). In other words, cognitive impairment

involved in “fight or flight” responses may be activated during flooding when more effective responses or cognitive facilities are scrambled or disorganized (Gottman, 1993; Malik et al., 2020).

Therefore, individuals who experience flooding may be at a particular risk for engaging in aggressive behaviors such as IPV. Not only is the individual motivated to end the aversive experience of flooding, they also have reduced cognitive capacity for self-regulation and problem-solving (Malik et al., 2020). As a result, the flooded individual may be particularly susceptible to act on aggressive urges when systems of regulation and the ability to seek alternatives to conflict are depleted. Consistent with this conceptualization, the literature has implicated flooding in aggression in both couples (Malik et al., 2020; O’Leary, et al., 2007) and parenting contexts (Del Vecchio et al., 2016; Mence et al., 2014; Slep & O’Leary, 2007). This demonstrates the universal importance flooding plays in aggression at the dyadic level, and therefore may be a key factor during couple’s conflict.

Executive Functioning and Aggression

Particularly due to the cognitive impairment indicative of flooding and the strong urge to terminate the aversive experience, individual differences in self-regulatory processes may play an important role in whether the flooded individual is able to respond more effectively or to lean on more automatic and aggressive responses. EF is defined as a set of distinct, yet interrelated processes involved in planning, formulating, and achieving goals (Humenik et al., 2020; Miayke et al, 2000). These top-down cognitive processes are important in self-regulation (Zelazo & Carlson 2012). EF may act as “brakes” to stop more automatic, impulsive, and aggressive behaviors (Holley et al.,

2017). Inversely, deficits in EF may decrease behavioral control and self-regulation, and are implicated with strong impulsivity, anxiety, aggression, and low self-regulation (Romero-Martínez et al., 2013).

The literature suggests that EF deficits are related to IPV in batterers (for review, see Horne et al., 2020; Humenik et al., 2020). EF is generally considered to be made up of inhibition, cognitive flexibility, and working memory (Miyake et al., 2000) which may all play a role in "putting on the brakes" during couples conflict. For example, inhibition, or the stopping of prepotent responses, may play an important role in inhibiting automatic responses that escalate conflict and the likelihood of aggression (Bueso-Izquierdo et al., 2016). Inhibition has been implicated in IPV in both convicted men (Romero- Martínez, Lila, & Moya-Albiol, 2019) and convicted women batterers (Shorey et al., 2011). Similarly, cognitive flexibility, or the switching between mental processes, may be involved in perseverative thinking, in which an individual fixates on poor problem-solving strategies due to mental rigidity (Holley et al., 2017). Cognitive flexibility deficits have been implicated in IPV in samples of male batterers (Romero-Martínez, Lila, & Moya-Albiol, 2019; Stanford et al., 2007). Additionally, working memory, or the ability to hold, manipulate, and track information is involved in attention, anticipating changes, and adapting and searching for strategies (Afonso, Garganta, & Mesquita, 2012; Romero-Martínez et al., 2021) which may be particularly important during conflict. Working memory has also been implicated in social information processing such as misinterpreting social cues, which is associated with aggression (Granvald & Marciszko, 2016). Working memory deficits have been linked with IPV in male batterers (Lishak et al., 2019; Romero-Martínez, Lila, Vitoria-Estruch, & Moya-Albiol, 2021). Taken

together, these logical, cool domains of executive function may play an important role in self-regulation to effectively navigate couples conflict during the negatively valanced and heated context of flooding.

Flooding, Executive Functions, and Aggression

Those with EF deficits may have reduced self-regulatory & problem-solving capabilities, or the ability to "put on the brakes" (Holley et al., 2017). This could be particularly problematic for individuals who feel flooded by their partner and may be a "perfect storm" combination that puts the flooded individual at greater risk for perpetrating IPV. For example, an individual who feels flooded, but has greater EF capabilities may act as a buffer or protective factor. Although the individual feels scrambled and highly overwhelmed, they may be able to think more flexibly (e.g., perspective taking, generating creative solutions or compromises), track the argument more effectively (e.g. make fewer negative misinterpretations about their partner), and inhibit impulses (e.g. stopping automatic aggressive responses) better despite feeling overwhelmed in the moment. Thus, they may be able to access de-escalatory strategies more readily despite the depletion of cognitive resources during flooding. In support of this conceptualization, there is evidence suggesting that employing strategies involved in executive control during emotional "hot" conditions is demonstrated to reduce hostility (Ayduk et al., 2002), a predictor of IPV (Norlander & Eckhardt, 2005). This suggests that strong executive functioning may prevent the activation of more automatic hot-system responses (i.e., flooding) that escalate conflict (Ayduk et al., 2002). Conversely, a flooded individual with poorer EF may not already have the strongest ability to think more flexibility, track the argument, and stop impulses. When flooded, the individual

may be especially prone to relying on automatic and overlearned responses, and without strong EF to serve as “brakes”, may be especially likely to engage in aggression.

Current Study

The current study examines the associations of EF deficits, flooding, and psychological and physical aggression. Specifically, inhibition, cognitive flexibility, and working memory—the three main components of executive functioning—were examined. Because IPV victimization is at its greatest risk in young adults ages 18-24 (Walters et al., 2010), and only 33.7% of the US population has a bachelor’s degree, a non-college young adult sample was used to study those most at risk to perpetrate and experience IPV. The goal of the present study was to determine whether EF deficits may amplify risk for IPV perpetration in individuals who experience emotional flooding. I predicted that 1) flooding and EF deficits would both be associated with IPV. Furthermore, 2) there would be a moderating interaction effect such that individuals high on flooding and EF deficits would experience the greatest frequency of both physical and psychological aggression.

Methods

Participants

A total of 105 individuals participated in the study during the spring of 2018. Individuals who were currently in a relationship or married, and who were not currently enrolled in college were eligible to participate. Participants were recruited online via Qualtrics research panel, an online recruitment service and survey platform. Qualtrics invites potential participants who meet eligibility criteria to participate in return for rewards such as gift cards and discounts at stores. The mean age of participants was 22.0 years (SD = 1.86). Fifteen percent identified as Spanish, Latino/a, or Hispanic of any race. Non-Latino/a participants were African American (11%), Asian (5%), Caucasian (85%), Pacific Islander (1%), and American Indian or Alaskan Native (1%). Participants were able to select multiple racial categories. Additionally, 76% of participants identified as female, 21% as male, and 2% as transgender and 1% do not identify. The mean relationship length was 138.68 weeks (SD = 109; minimum = 0 maximum = 424).

Procedure

Participants completed computer-based measures of executive functioning using Inquisit 5 (2018), and a questionnaire battery via Qualtrics (2018). The executive function tasks were administered using a counterbalanced Latin Square design to reduce order effects. For the questionnaires, demographic items were presented first followed by the remainder of the battery in a randomized order. The protocol was a part of a larger study which took participants approximately 1.5-2 hours to complete.

Measures

Flooding. The Emotional Flooding Scale-Short Form (EFS-SF; Slep & Heyman, 1998) is a 6-item abbreviated measure of the degree to which a participant feels overwhelmed by their partner's negative affect (i.e., anger) and experiences it as unpredictable (e.g., "My partner's anger overpowers me", "I feel paralyzed during my partner's angry outbursts", "The intensity of my partner's anger catches me off guard"). Items are rated on a 5-point Likert scale from 1 = almost always to 5 = never. Total scores are obtained by reverse scoring and averaging the items so that a higher score indicates a greater frequency of flooding (ω =0.943).

Inhibition. The Stroop Test (Stroop, 1935; Millisecond Software, 2016) is a measure of inhibition that requires identifying color words (e.g., "red" or "green"). For congruent trials, words are printed in the same color as the word meaning. For incongruent trials words are printed in a different color than the word meaning (e.g., the word "red" printed in the color blue). The computerized Inquisit version of this task was used in which the participant must select the corresponding key on the keyboard to indicate the correct meaning of the word. The task takes approximately two minutes to complete. The interference score is calculated by subtracting the response time in the congruent condition from the incongruent condition. The difference in response times is used as a latent measure of one's ability to inhibit an overlearned response in favor of an unusual one such that higher scores indicate poorer inhibitory ability.

Cognitive Flexibility. The Wisconsin Card Sorting Test (WCST; Grant & Berg 1993; Millisecond Software, 2016) is a measure of cognitive flexibility in which participants sort cards while adapting to rule changes without instructions or warnings.

This computerized task requires sorting virtual cards into four categories based on similar designs with varying colors, shapes, and numbers. The participant must determine the sorting rule through trial and error until the rule changes and the participant must once again shift tasks. The task takes approximately five minutes to complete. Categories completed (CC) and perseverative errors (as measured by failure to maintain set; FMS) are the most common measures of cognitive flexibility used on the WCST (Strauss et al., 2006). Categories completed is calculated by the total number of sets of 10 correct responses per category. Higher scores indicate stronger cognitive flexibility.

Working Memory. The Digit Span Task: Backward (Digit Span; Wechsler, 1997a; Woods et al., 2011; Millisecond Software, 2016) is a measure of auditory working memory in which participants list numbers in the opposite order that they were presented in. Each trial increases the amount of numbers listed in a set with a maximum of eight numbers presented at a time. The computerized version of this task involves selecting the correct numbers from a circle of numbers with their mouse. The task takes approximately fifteen minutes to complete. The Digit Span Backward score is determined by the last digit span a participant gets correct, or the amount of numbers listed in the last correct trial before making two consecutive errors. Higher scores indicate stronger working memory capabilities.

Intimate Partner Violence. The Conflict Tactics Scale (CTS-2) is a 40-item measure of partner aggression perpetration (CTS-2; Straus, Hamby, Boney-McCoy, & Sugarman, 1996). Participants report on the frequency of their own and their partner's engagement in physical (e.g., "I pushed or shoved my partner") and psychological aggression (e.g., "I insulted or swore at my partner"). Items are rated on an 8-point Likert

scale from 0 = never to 6 = more than 20 times in the past year, with an additional option of 7 = not in the past year, but it did happen before. The 16-item psychological aggression and 24-item physical aggression scales were calculated separately by averaging items for a total score for each scale.

Data Analytic Strategy

The rate of missing data was minimal (1.87% for two variables). Full information maximum likelihood (FIML) regression models were used in analyses to account for missing data. Spearman's rank correlations were conducted among the primary variables due to the positive skew of the data. Gender and age were not significantly correlated with the outcome variables, so they were not controlled for in further analyses. Next, six moderation analyses were conducted to examine the moderating effect of various domains of executive functioning on flooding and two types of intimate partner violence—physical and psychological aggression. Specifically, inhibition, cognitive flexibility, and working memory were separately explored as measures of executive functioning. Flooding and executive functioning variables were standardized prior to the analyses for ease and clarity of interpreting results. Moderation analyses were computed using FIML regression models with bias-corrected bootstrapped estimation (10,000 replicates) using Mplus 7.0 (Muthén & Muthén, 1998-2012). The 95% bias-corrected confidence intervals were used to evaluate statistical significance.

Results

Overall, 28.57% of the sample reported any physical aggression and 69.52% of participants reported any psychological aggression. However, frequency of aggression in the sample was relatively low for both physical (M = 0.67, SD = 1.49.) and psychological aggression (M = 2.17, SD = 1.99). Age and gender were not significantly associated with physical or psychological aggression.

Descriptive statistics and Spearman's rank correlations among the primary variables are reported in Table 1. Flooding was significantly associated with psychological aggression (r_s= 0.33, p < .001). The relation between flooding and physical aggression was nonsignificant. Additionally, the association between the three domains of executive functioning and IPV were nonsignificant for both physical and psychological aggression.

Six moderation analyses were conducted to explore the moderating role of various domains of EF (i.e., inhibition, cognitive flexibility, and working memory) on flooding and intimate partner violence. Separate analyses were conducted for the two outcome variables—frequency of physical and psychological aggression. All of the moderation models were nonsignificant, as shown in Tables 2 and 3.

Discussion

The present study explored how flooding and executive functioning may interact to increase risk of IPV perpetration. Previous studies have found associations between flooding and IPV and executive functioning to IPV individually but have not examined how these variables may amplify risk. Furthermore, many studies linking executive functioning to IPV used samples of convicted IPV perpetrators, but fewer studies examine these associations in non-forensic young adults, who are at high risk for IPV victimization. The study hypothesized that 1) both flooding and EF would be associated with IPV and 2) that domains of EF (inhibition, cognitive flexibility, and working memory) would moderate the association between flooding and physical and psychological IPV respectively. The results partially support the first hypothesis, and do not support the second hypothesis.

Flooding was significantly associated with psychological aggression, which is consistent with previous findings (O'Leary, et al., 2007). This partially supports the first hypothesis that flooding would be associated with IPV. However, the relationship between flooding and physical aggression was nonsignificant. This differs from previous findings, in which couples classified as distressed/IPV (as defined by having a minimum of two male-to-female physical IPV acts) were found to have the highest levels of flooding (Malik et al., 2020). Overall, these findings demonstrate the importance of flooding and psychological aggression within young adult non-college couples, as well as how types of aggression may have varying risk factors within distinct samples. Furthermore, psychological and physical aggression were significantly correlated in the current study. Therefore, although flooding may not be directly related to physical aggression in the current sample, it may be valuable to explore the extent to which risk

factors for physical and psychological aggression may vary, overlap, or differentially amplify risk based on other variables.

Furthermore, the results did not support the hypothesis that EF would be related to IPV. Rather, none of the domains of executive functioning were significantly correlated with the two IPV outcome variables—physical and psychological aggression. The results were inconsistent with previous findings that IPV is related to inhibition (Romero- Martínez, Lila, & Moya-Albiol, 2019; Shorey et al., 2011), cognitive flexibility (Romero-Martínez, Lila, & Moya-Albiol, 2019; Stanford et al., 2007), and working memory (Lishak et al., 2019; Romero-Martínez, Lila, Vitoria-Estruch, & Moya-Albiol, 2021). Notably, the current study used a sample of non-college young adults, as compared to the forensic samples of convicted IPV perpetrators used in previous research. Group differences in the samples (such as differences in frequency and severity of aggression) may explain why EF deficits may be related to IPV in incarcerated samples, but not non-forensic young adult samples. Similarly, in the current sample, EF functioning may not play a role in aggression as seen in populations with greater deficits and levels of aggression. Additionally, although the correlation did not reach statistical significance, the relationship between working memory and psychological aggression appears to be trending towards significance, and may be worth exploring the role of working memory and aggression in future research in young adults.

For both physical and psychological aggression, all six of the moderation analyses were nonsignificant and did not support the second hypothesis. These findings are inconsistent with previous studies in the parenting literature that demonstrated a moderating role of EF on difficulties with vagal regulation (a biomarker of emotion

regulation; Lorber et al., 2016) and parent-adolescent conflict (Sturge-Apple et al., 2019). One explanation for the null findings for both the moderation analyses and correlations may be that the sample was low in aggression across both physical and psychological aggression. It may be difficult to examine IPV and its correlates due to the generally non-aggressive nature of the current sample. Recruiting and screening young adult couples with a greater frequency of IPV is necessary for future studies to investigate how flooding and EF relate to IPV in younger at-risk samples.

Similarly, the lack of reported aggression in the sample may explain the discrepant finding that flooding was associated with psychological, but not physical aggression. Previous research has suggested that flooding is associated with both physical and any aggression (i.e., physical and psychological aggression scores combined) (Malik et al., 2020; O'Leary, et al., 2007). Although the sample is relatively low in aggression across both physical and psychological aggression, psychological aggression is more common in couples (O'Leary & Williams, 2006; Straus & Gelles, 1990) and reported at a greater frequency in the current sample. Therefore, because psychological aggression is reported at a higher frequency in the sample, and physical aggression is not very present, this may explain why the relation between flooding and psychological aggression was picked up, but there was not enough physical aggression in the sample to replicate previous findings. Alternatively, it may be that for young adults who exhibit relatively infrequent aggression, especially lack of physical aggression, flooding is not related to physical aggression and differs from incarcerated samples and samples of IPV/distressed adult couples.

Another possible explanation for the null findings for the moderation analyses may be that the sample size of 107 participants was underpowered to detect significant indirect effects. For example, Champoux & Peters (1987) suggest that 200 participants are required in order to detect a moderator with a standardized effect beta of 0.2 and larger samples are necessary in order to obtain good power to detect moderators with a standardized strength of 0.1. Consequently, the nonsignificant moderation models must be interpreted with caution, as the models may have been unable to detect significant effects, and therefore unable to draw more conclusive results about the relationship between flooding, EF, and IPV.

Furthermore, none of the domains of EF were significantly related to physical or psychological aggression. Similarly, it may be that the sample was too low in reported aggression to pick up any associations among EF variables. Alternatively, the results may suggest that the role of EF deficits in IPV may not generalize to young adult samples in the same way as incarcerated samples. Prior research suggests that EF deficits are implicated in aggression (Horne et al., 2020). Specifically, results demonstrate that inhibition (Romero- Martínez, Lila, & Moya-Albiol, 2019; Shorey et al., 2011), cognitive flexibility (Romero-Martínez, Lila, & Moya-Albiol, 2019; Stanford et al., 2007) and working memory (Lishak et al., 2019; Romero-Martínez, Lila, Vitoria-Estruch, & Moya-Albiol, 2021) are each independently associated with IPV. However, most of the studies used samples of convicted IPV perpetrators, who may display a greater frequency of aggression than the general population. These EF deficits may only be seen in more extreme cases of IPV and may not replicate in young samples who report less frequent aggression.

Furthermore, issues with measurement may have contributed to null findings. For example, in young adult samples, self-report measures may tap into more global executive functioning abilities used during conflict, as opposed to task measures tapping more specific abilities used in the current study. Research has shown that performance-based and self-report ratings of EF do not correlate, suggesting that they tap into different underlying constructs of EF (Toplak et al., 2012). These performance-based or task measures may provide information about the level of efficiency of processing in a structured environment with pre-determined goals for assessment designed by the examiner, (i.e. such as instructions to perform optimally or to "try your best"). Alternatively, self-report measures assess EF in goal driven pursuits in which optimal decision-making may occur (Toplak et al., 2012). Likewise, performance on traditional task-measures may have issues with ecological validity, or difficulties generalizing to real-world scenarios of conflict that leads to IPV (Dierks et al., 2022; Parsons et al., 2017). Therefore, task-measures of EF may not tap into the type of cognitive functioning that is important in dating aggression in non-college young-adult samples, and self-report measures or other types of performance-based measures may play more of a role. In other words, self-report measures may tap into one's individual ability to use EF in a more general, global, or contextualized nature of conflict, whereas task-based measures may be more abstract or specific to a particular performance. In support of this, Finkel et al. found that individuals with greater inhibitory control were less likely to perpetrate IPV in a college sample using a self-report measure (2009).

Alternatively, the use of measures of hot EF may be more suitable for studying aggression in young adult samples. Other research suggests that EF tasks designed to tap

into emotionally hot EF processes may play an important role in decision making deficits that lead to maladaptive responses during emotionally charged situations (Séguin et al., 2007). Future studies should incorporate both hot EF and cool EF measures in order to understand how impairments in each pathway may or may not lead to maladaptive decision making (Séguin et al., 2007). For example, Chan et al., (2010) used an emotional stroop task and found that slower reaction time on the stroop was associated with reactive aggression in IPV perpetrators. Other studies using the traditional cool stroop task found null findings between EF and IPV perpetration (Cohen et al., 2003; Easton et al., 2008). Therefore, measures that tap into hot EF processes may more closely measure the types of EF used during heated conflict that leads to IPV. Other measures such as the Iowa Gambling task, a measure of affective learning and decision making (Kully-Martens et al., 2013) have also been implicated in the literature with IPV (Easton et al., 2008), and may be more relevant to the type of EF activated during conflict.

The present study also had numerous strengths. Overall, the current study aimed to examine how flooding and executive functioning may interact to elucidate risk factors for IPV. Results build upon the burgeoning literature of flooding, by demonstrating that flooding is significantly related to psychological aggression in a non-college young adult sample. Furthermore, this study emphasizes studying aggression in a young adult sample, in which individuals are at their greatest risk of IPV victimization (Walters et al., 2010; Halpern et al., 2009). Future research should continue to target this at-risk period in time to improve understanding of what increases risk for IPV in young adulthood. Although there were several null findings, this study demonstrates the importance of replicating findings from incarcerated samples to at-risk, young adult samples to better understand

how aggression develops overtime and related preventative measures. Additionally, the present sample is ethnically diverse and generally reflects national percentages in racial demographics similar to the 2020 US Census (U.S. Census Bureau QuickFacts: United States, 2020). Furthermore, according to the 2020 US Census, only 33.7% of the US population has a bachelor's degree or higher, demonstrating the importance of including non-college samples for generalizability in lieu of college convenience ssamples (U.S. Census Bureau QuickFacts: United States, 2020).

Table 1
Descriptive statistics and correlations of variables

Measure	1	2	3	4	5	6
1. Flooding	-					
2. Inhibition	.09	-				
3. Cognitive Flexibility	-.07	-.14	-			
4. Working Memory	-.08	-.01	.07	-		
5. Physical Aggression	.13	.10	-.03	.14	-	
6. Psychological Aggression	.33***	.17	-.12	.18	.54***	-
M	2.08	267.58	5.16	7.12	.67	.87
SD	1.15	301.24	1.42	3.78	1.49	.87
Minimum	1.00	-331.44	0.00	1.00	0.00	0.00
Maximum	5.00	1451.92	6.00	15.00	9.00	7.00

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

Table 2
Moderated Association of Flooding and Physical Aggression

				95%CI		
	Step, Predictor	β	*B (SE)*	LL	UL	R^2
1	Flooding	.124	.039 (.042)	-.112	.341	
	Inhibition	.017	.005 (.022)	-.111	.190	.016
2	Flooding	.172	.054 (.050)	-.106	.426	
	Inhibition	.002	.000 (.024)	-.130	.180	
	Flooding x Inhibition	-.119	-.030 (.025)	-.288	.054	.028
1	Flooding	.141	.044 (.044)	-.107	.359	
	Cognitive Flexibility	.075	.023 (.032)	-.161	.222	.021
2	Flooding	.195	.061 (.052)	-.109	.453	
	Cognitive Flexibility	.049	.015 (.029)	-.201	.183	
	Flooding x Cognitive Flexibility	.175	.047 (.035)	-.051	.387	.048
1	Flooding	.134	.042 (.041)	-.088	.310	
	Working Memory	.126	.039 (.028)	-.043	.283	.032
2	Flooding	.140	.044 (.044)	-.102	.358	
	Working Memory	.130	.041 (.031)	-.053	.318	
	Flooding x Working Memory	.064	.022 (.033)	-.094	.233	.036

Note. Significant estimates are bolded (95% CI zero exclusive).

Table 3
Moderated Association of Flooding and Psychological Aggression

				95%CI		
	Step, Predictor	β	*B (SE)*	LL	UL	R^2
1	Flooding	.412	.385 (.089)	.197	.586	
	Inhibition	-.022	-.021 (.069)	-.156	.125	.168
2	Flooding	.407	.380 (.109)	.152	.622	
	Inhibition	-.021	-.020 (.084)	-.177	.145	
	Flooding x Inhibition	.012	.009 (.089)	-.166	.226	. 168
1	Flooding	.409	.382 (.087)	.200	.579	
	Cognitive Flexibility	.003	.003 (.081)	-.175	.164	. 167
2	Flooding	.403	.377 (.095)	.170	.596	
	Cognitive Flexibility	.005	.005 (.081)	-.172	.167	
	Flooding x Cognitive Flexibility	-.019	-.015 (.081)	-.210	.162	. 167
1	Flooding	.421	.393 (.082)	.211	.584	
	Working Memory	.199	.185 (.078)	.028	.363	.207
2	Flooding	.430	.401 (.084)	.209	.600	
	Working Memory	.205	.191 (.083)	.030	.385	
	Flooding x Working Memory	.092	.093 (.079)	-.055	.234	.215

Note. Significant estimates are bolded (95% CI zero exclusive).

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