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# EXPLORING SEXUAL MINORITY STRESS RELATED AGGRESSION

by

MIKLÓS B. HALMOS

Under the Direction of Dominic J. Parrott, PhD

## ABSTRACT

Intimate partner violence among sexual minority individuals is a unique public health disparity in frequency and severity compared to heterosexual individuals. Existent research suggests experiencing sexual minority stress (SMS) is associated with negative health outcomes for individuals, including intimate partner violence. Research to date has not yet established the causal association between SMS and aggression perpetration nor its underlying mechanisms. Utilizing the Psychological Mediation Framework and the General Aggression Model, the current investigation sought to assess the proximal and temporal associations between induced state SMS and cyber aggression perpetration via an online experimental study. Furthermore, the investigation sought to evaluate two putative mediating mechanisms (negative affect, cognitive rumination) of SMS-related aggression. A sample of 110 cisgender, sexual minority identifying

men and women (52% women) were recruited online via a research panel. Participants were randomized to a control or experimental condition in which they had general or sexual stigma stress induced, respectively. Participants then completed an online cyber aggression task. Self-reported state negative affect and cognitive rumination were assessed at various timepoints during the stress induction task and post aggression task. Participants also completed self-report measures of relevant constructs (i.e., SMS experiences, state affect, state cognition rumination, dispositional aggression, and intimate partner violence perpetration). Findings suggest a lack of differentiation in induced stress between the two study conditions as well as no differences between the study groups in cyber aggression perpetration. Furthermore, analyses failed to detect any mediating effects of negative affect and rumination in the association between SMS and aggression perpetration nor any association between cyber aggression perpetration and intimate partner violence perpetration. The limitations of the study's online methodology did not allow conclusions to be drawn for the research aims and emphasize the continued need for further research into this important area of public health.

**INDEX WORDS:** Sexual minority stress, Sexual stigma, Aggression, Violence

EXPLORING SEXUAL MINORITY STRESS RELATED AGGRESSION

by

MIKLÓS B. HALMOS

A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy

in the College of Arts and Sciences

Georgia State University

2021

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2021

EXPLORING SEXUAL MINORITY STRESS RELATED AGGRESSION

by

MIKLÓS B. HALMOS

Committee Chair: Dominic J. Parrott

Committee: Sierra E. Carter

Ethan H. Mereish

Kevin M. Swartout

Eric R. Wright

Electronic Version Approved:

Office of Graduate Studies

College of Arts and Sciences

Georgia State University

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## DEDICATION

I wish to thank everyone who has supported my journey throughout my academic career. I would like to particularly thank my mother who has always been my greatest supporter and has sacrificed so much and worked so hard to provide opportunities for my brother and I. I would like to also particularly thank Rebecca (love you), Bret, Viktor, and David for their support and love. I would also like to thank Daisy, Mauja, Spike, Buffy, everyone in my extended family and friends, lab mates, and countless others who have provided support, welcome distractions, and lots of reminders to enjoy the small moments and not forget to have fun. I am incredibly proud of my efforts as I approach the end of my doctoral journey, but the honor of my success goes to the small village of folks who made this possible for me in both ways I know and will never know.

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## TABLE OF CONTENTS

ACKNOWLEDGEMENTS .....	V
LIST OF TABLES .....	X
LIST OF FIGURES .....	XI
<b>1 INTRODUCTION .....</b>	<b>1</b>
<b>1.1 Sexual Minority Stress .....</b>	<b>2</b>
<b>1.2 A General Aggression Model of SMS-related Aggression.....</b>	<b>5</b>
<b>1.3 Overview of the Study and Hypotheses.....</b>	<b>8</b>
<i>Hypothesis 1 .....</i>	<i>10</i>
<i>Hypothesis 2.....</i>	<i>10</i>
<i>Hypothesis 3.....</i>	<i>10</i>
<i>Hypothesis 4.....</i>	<i>10</i>
<i>Hypothesis 5.....</i>	<i>11</i>
<b>2 METHOD .....</b>	<b>11</b>
<b>1.4 Participants .....</b>	<b>11</b>
<b>1.5 Recruitment and Eligibility Criteria .....</b>	<b>11</b>
<b>1.6 Experimental Design .....</b>	<b>12</b>
<b>1.7 Stress Induction Task .....</b>	<b>13</b>
<b>1.8 Aggression Task .....</b>	<b>13</b>
<i>Mean Chat Aggression. ....</i>	<i>14</i>

	<i>Maximum Chat Aggression</i> .....	14
	<i>Proportion of Chats with Swearing</i> .....	14
<b>1.9</b>	<b>Materials</b> .....	<b>14</b>
	<i>Demographic form</i> .....	14
	<i>Positive and Negative Affect Schedule – Momentary (PANAS)</i> .....	14
	<i>State Rumination Instrument (SRI)</i> .....	15
	<i>Daily Heterosexist Experiences Questionnaire (DHEQ)</i> .....	16
	<i>Revised Internalized Homophobia Scale (IHS-R)</i> .....	16
	<i>Buss-Perry Aggression Questionnaire (BAQ)</i> .....	17
	<i>Sexual and Gender Minority - Conflict Tactics Scale - 2 (SGM-CTS2)</i> . ....	17
	<i>Cognitive Interview (CI)</i> .....	18
<b>1.10</b>	<b>Procedures</b> .....	<b>19</b>
<b>3</b>	<b>RESULTS</b> .....	<b>23</b>
<b>1.11</b>	<b>Preliminary Analyses</b> .....	<b>23</b>
	<i>Group Differences</i> . ....	23
	<i>Aggression Checks</i> .....	24
<b>1.12</b>	<b>Hypotheses Testing</b> .....	<b>24</b>
	<i>Hypothesis 1</i> .....	24
	<i>Hypothesis 2</i> .....	27
	<i>Hypothesis 3 and 4</i> .....	31

<i>Hypothesis 5</i> .....	34
1.13 Post-Debriefing Survey .....	34
<b>4 DISCUSSION</b> .....	<b>35</b>
1.14 Limitations .....	39
1.15 Conclusion .....	41
<b>REFERENCES</b> .....	<b>42</b>
<b>APPENDICES</b> .....	<b>51</b>
Appendix A: Table 1 .....	51
Appendix B: Table 2 .....	52
Appendix C: Table 3 .....	53
Appendix E: Demographic Form .....	53
Appendix F: The Positive and Negative Affect Schedule – Momentary .....	56
Appendix G: State Rumination Instrument .....	57
Appendix H: Daily Heterosexist Experiences Questionnaire.....	58
Appendix I: Revised Internalized Homophobia Scale – Men’s Version .....	60
Appendix J: Revised Internalized Homophobia Scale – Women’s Version .....	61
Appendix K: Internalized Homophobia Scale – Men’s Version.....	62
Appendix L: Buss-Perry Aggression Questionnaire .....	63
Appendix M: Sexual and Gender Minority – Conflict Tactics Scale – 2 .....	64
Appendix N: Post Debriefing Survey .....	67

**Appendix O: Cognitive Interview ..... 68**

**Appendix P: Brief Study Procedure ..... 69**

**LIST OF TABLES**

Table 1. Sample Demographics by study condition. (N=110).....	51
Table 2. Means and standard deviations for study variables by study condition. (N=110).....	52
Table 3. Bivariate intercorrelations of study measures of aggression (N = 110). ....	53

**LIST OF FIGURES**

Figure 1. TAP-Chat "Reaction time game" tutorial window.....	20
Figure 2. Spaghetti plot of individual TAP-Chat aggression trajectories in the full sample (N =110). Note. The black line represents the grand mean. Trial 1 = Trial 0 in the task. ....	28
Figure 3. Spaghetti plot of individual TAP-Chat aggression trajectories in the General Stress condition (N = 56). Note. The black line represents the grand mean. Trial 1 = Trial 0 in the task .....	29
Figure 4. Spaghetti plot of individual TAP-Chat aggression trajectories in the SMS condition (N =54). Note. The black line represents the grand mean. Trial 1 = Trial 0 in the task. ....	30

## 1 INTRODUCTION

Sexual minority individuals are a stigmatized population that experience a range of physical and mental health disparities related to the social context of their identities (e.g., stigma-related stress, Williams & Mann, 2017). One important yet understudied health disparity for this population is their experience with intimate partner violence (IPV), or violence perpetrated by partners against one another within intimate relationships (Edwards, Sylaska, & Neal, 2015). Recent estimates utilizing nationally representative surveys suggest that IPV perpetrated amongst sexual minority individuals (i.e., lesbian, gay, bisexual, and other sexual identities whose sexual identity, orientation, attraction, and behaviors differ from the majority of the surrounding society [Meyer & Wilson, 2009]) is a serious problem both in severity (Graham, Jensen, Givens, Bowen, & Rizo, 2019; Walters, Chen, Breiding, 2013) and frequency (Messinger, 2011). In fact, IPV among sexual minorities is an especially important area for research due to its higher frequency and greater severity compared to IPV amongst heterosexual couples (Edwards, Sylaska, & Neal, 2015). Examining and understanding IPV among sexual minority individuals likely intersects with a number of other negative health disparities unique to this population (mental and physical, Williams & Mann, 2017) that share common underpinnings (e.g., causes, consequences) for these individuals. Not surprisingly, factors unique to sexual minority individuals (e.g., stigmatizing experiences) likely are primary drivers of the disproportionately higher levels of health care costs incurred treating sexual minorities compared to their heterosexual counterparts (O’Cleirigh et al., 2018). However, despite this clear import, research which seeks to elucidate the putative mechanisms for IPV perpetration in sexual minority populations is scant, particularly in relation to extant literature focused on other negative health outcomes for this population.

It is necessary to understand the etiology of IPV perpetration to be in the best position to prevent this key public health problem (CDC, 2019; Williams & Donnelly, 2014). Very little research to date has tested mechanisms that may drive IPV perpetration in sexual minority populations. In particular, the pivotal role of sexual minority stress (SMS, psychological distress resultant of experiencing sexual stigma) – which has been a well-documented risk factor for other adverse health outcomes in sexual minorities – has received comparatively less attention as a risk factor for IPV perpetration in sexual minority populations. Only recently has research integrated the role of SMS into existent models of IPV (Shorey, Stuart, Brem, & Parrott, 2018). However, no study to date has examined the potential underlying mechanisms between SMS and IPV perpetration. As such, the etiology of SMS-related IPV perpetration is not well understood. This investigation sought to address this gap in the literature by examining potential mechanisms that underlie the putative effect of SMS on aggression perpetration in sexual minority individuals.

### **1.1 Sexual Minority Stress**

Sexual minority individuals experience not only the daily and chronic stressors that many people encounter in their lives but also stressors that are unique to and resultant from their social experiences as sexual minorities in a heteronormative society. Heteronormative societies often view sexual minority individuals and their sexual orientations, attractions, behaviors, and relationships as a negative phenomenon and attach a negative cultural stigma, hereto referred to as sexual stigma (Herek, 2007). This sexual stigma is broadcast in two ways that sexual minority individuals may perceive, those being distal and proximal processes of sexual stigma (Meyer, 2003). Distal processes (e.g., heterosexism) are prejudice-fueled negative experiences directed at sexual minority individuals (e.g., enacted stigma, Herek, 2007) including threatening behavior



such as harassment, discrimination, aggressive/violent behavior (Meyer, 2003), and microaggressions (Fisher, Woodford, Gartner, Sterzing, & Victor, 2019). Proximal processes of sexual stigma include internal stressors experienced by those with minority identities including self-stigmatization and expectations of rejection.

Individuals who directly experience and/or perceive distal sexual stigma around themselves and develop proximal sexual stigma may further develop psychological distress as a result. This distress is commonly referred to as sexual minority stress (SMS). Minority Stress Theory (Brooks, 1981; Meyer, 1995; 2003) conceptualizes SMS as both an external and internal process. External SMS is the psychological distress that develops in response to experiencing direct stigma-based negative interactions (e.g., harassment, discrimination, assault, etc.) or distress due to apprehensions of potential stigma-based negative experiences (e.g., felt stigma; Herek, 2007) that compel sexual minority individuals to constantly monitor their surroundings for perceived threats and rejections. In contrast, internal SMS is the distress resultant from internalizing or integrating sexual stigma into a negative self-view (i.e., proximal stressors, Meyer, 1995, 2003). Extant literature has referred to internal SMS in myriad ways, including internalized stigma (Herek, 2007), sexual shame (Rendina, López-Matos, Wang, Pachankis, & Parsons, 2019), sexual self-stigma (Timmins, Rimes, & Rahman, 2019), internalized homophobia (Shidlo, 1994), internalized homonegativity (Choi, Merrill, & Israel, 2017) and internalized heterosexism (Szymanski, Kashubeck-West, & Meyer, 2008). The process of developing SMS includes myriad social and personal stressors including, but not limited to, isolation/loneliness, hiding/shame (Franke & Leary, 1991), financial hardship (Gordon, 2001), problems with interpersonal relationships (Lewis, Derlega, Berndt, Morris, & Rose, 2001), and gender role stress (Crawford, Allison, Zamboni, & Soto, 2002).

To alleviate SMS, sexual minority individuals are forced to adapt, either as a way to protect oneself from external SMS and/or as method of coping with internal SMS (Meyer, 2003). These alterations to cognition and behavior can be maladaptive and result in a multitude of significant, negative health outcomes. For instance, research has demonstrated that sexual minorities are twice as likely to be diagnosed with a mood or anxiety disorder relative to their heterosexual counterparts (Meyer, 2003). In fact, SMS contributes to increased risk for a host of other illnesses, both mental and physical (Williams & Mann, 2017). Sadly, research also supports a link between SMS and many forms of harmful maladaptive coping (e.g., suicide, self-harm, risky sexual behavior, substance abuse, etc.) (Meyer, 2003). Equally important, there are a number of negative outcomes of SMS that may also manifest themselves at the societal level. Increased SMS has been associated with increased transmission of sexually transmitted diseases and lower adherence to HIV/AIDS treatment and treatments for other sexually transmitted diseases (Huebner, Davis, Nemeroff, & Aiken, 2002). SMS may also lead to disproportionately higher levels of health care costs in sexual minorities compared to their heterosexual counterparts (O’Cleirigh et al., 2018). Lastly and relevant to this proposal, experiencing SMS has also been associated with IPV perpetration (for a detailed review, see below).

Since Meyer’s (1995, 2003) development of minority stress theory, researchers have built upon the model and applied it to a number of areas in sexual minority research. These expansions include the Intersectional Ecology Model of LGBTQ Health (Mink, Lindley, & Weinstein, 2014) which models how the chronic stress sexual minority individuals endure as a result of concealing and defending their identities impacts their health. This model particularly focuses on the cyclical interplay between external stressors (i.e., stigma) and internal processes (i.e., appraisal and coping) as well as how this interplay predicts health outcomes. Another

development in minority stress research is the Psychological Mediation Framework (Hatzenbuehler, 2009). This model posits three specific mechanisms by which group and individual external and internal processes of sexual stigma and SMS negatively impact the development of psychopathology in sexual minority individuals: cognitive, affective/coping, and social skills/interpersonal interactions. This theory has advanced subsequent research that has highlighted the need for further work examining the specific mechanisms by which sexual stigma may cause SMS, and how SMS may affect other health outcomes, including aggression.

## **1.2 A General Aggression Model of SMS-related Aggression**

Aggressive behavior is any form of behavior directed toward the goal of harming or injuring another living being who is motivated to avoid such treatment (Baron & Richardson, 1994). One predominant integrative framework to explain the perpetration of aggression is the General Aggression Model (GAM; Anderson & Bushman, 2002). The GAM frames how specific individual and situational risk factors interact to facilitate internal states that alter one's appraisal of a situation and, in turn, influence the likelihood of aggression perpetration. Of particular relevance is the GAM's integration of cognitive and affective mechanisms of aggression (e.g., Berkowitz, 1989; 1990; Zillman & Bryant, 1974) which broadly postulate that increased negative affect (e.g., anger, fear) and hostile cognitions increase the likelihood of aggressive behavior by altering one's appraisal of perceived threat.

Given associations between SMS and adverse health consequences, it is unsurprising that SMS has also been associated with IPV perpetration (Longobardi & Badenes-Ribera, 2017; Martin-Storey & Fromme, 2021; Stephenson & Finneran, 2017). Existent sexual minority stress models (e.g., Hatzenbuehler, 2009; Mink et al., 2014) posit that SMS leads to negative health outcomes via affective and cognitive pathways. These pathways correspond to the internal

affective and cognitive pathways by which the GAM posits that aggression is fueled (Anderson & Bushman, 2002). Viewed within the GAM framework, sexual stigma is conceptualized as a distal risk factor, whereas state SMS is conceptualized as a proximal internal risk factor that manifests as stress responses, including elevated negative affect and cognitive rumination within individuals, placing them at risk of aggression. Thus, the experience of sexual stigma (i.e., the “stressor”) precedes SMS (i.e., the “response to the stressor”); in turn, SMS manifests as stigma induced stress responses affecting the internal state of individuals (i.e., elevations in negative affect, cognitive rumination) which are more proximal risk factors of aggression perpetration (Anderson & Bushman, 2002). Modeling these mechanisms as temporally mediated risk factors couched within the GAM allows greater understanding of the mechanisms underlying SMS-related aggression.

This framework advanced herein posits that experiencing sexual stigma leads to sexual minority stress (as reviewed above, e.g., Meyer, 1995). SMS manifests as stigma induced stress responses affecting the internal state (i.e., cognitions, affect) of sexual minority individuals. Indeed, extant literature indicates that SMS is positively associated with increased rumination (e.g., Lewis, Milletich, Derlega, & Padilla, 2014) and elevations in negative affect (e.g., Eldahan et al., 2016). Consistent with the GAM (Anderson & Bushman, 2002), this negative alteration in the internal state of individuals may place them at increased risk of aggression via heightened cognitive and affective processes. Indeed, both cognitive and affective factors have received ample support as drivers of aggression (Anderson & Bushman, 2002). This framework for SMS-related aggression mirrors the processes of SMS fueled negative health outcomes as proposed by Hatzenbuehler (2009) and Mink et al. (2014).

This conceptualization has received empirical support, albeit without the specific scaffolding of the GAM. Substantial evidence supports the proposed model's affective pathway, as proximal SMS is associated with increases in negative affect (e.g., Eldahan et al., 2016; Mason et al., 2016). Sexual minority individuals who experience sexual stigma may experience anger, distress, and fear (i.e., negative affect) (Mereish & Miranda, 2019), and these in turn may result in aggression (Anderson & Bushman, 2002). In additional support, a meta-analysis found that proximal SMS lowers self-esteem in sexual minority individuals to levels lower than in heterosexual counterparts (Bridge, Smith, & Rimes, 2019). Lowered self-esteem places individuals at risk for experiencing negative affect and depletes their ability to regulate negative affect (Bridge et al., 2019).

Substantial evidence also supports the model's cognitive pathway linking SMS and aggression. Individuals who have experienced proximal sexual stigma are more likely to ruminate upon their negative experiences and are at increased risk of internalizing sexual stigma (e.g., [after receiving a homophobic epithet] is this who I am?) (e.g., Szymanski, Dunn, & Ikizler, 2014; Timmins, Rimes, & Rahman, 2019). After the initial insult and resultant cognition (e.g., experiencing and cognitively ruminating over a homophobic epithet, as postulated by Hatzenbuehler [2009]), they may be at increased risk of subsequent aggression upon experiencing a provocation. This reaction is probable given their appraisal of provocations was negatively altered by their prior rumination after experiencing stigmatizing affronts. Indeed, in a sample of lesbian women, Lewis et al. (2014) found that the association between SMS and psychological intimate partner violence perpetration was mediated by rumination. In summary, experiencing SMS may place individuals at risk for aggression as mediated by their elevated negative affect and ruminations.

To date, only one study has modeled the mechanisms postulated herein that link SMS and IPV perpetration. Mason, Lewis, Gargurevich, & Kelley (2016) demonstrated that the association between SMS and physical IPV is mediated via negative affect and intrusiveness, though in a cross-sectional study. This finding buoys the conceptualization of SMS as a potential risk factor for negative affect (i.e., Hatzenbuehler's (2009) affective mediation pathway). This provides preliminary support for the use of the GAM as a framework for conceptualizing and testing the role of SMS in IPV perpetration.

However, current research tying SMS and IPV perpetration is limited in its ability to directly evaluate this association. A recent review noted that 93% of studies that examine aggression among sexual minority populations have been cross-sectional, and none have examined the mechanistic role of SMS (Kim & Schmuhl, 2019) utilizing designs that allow for causal hypothesis testing. As a result of this limitation, there exists no research which examines the temporal and causal association between SMS and aggression perpetration. Thus, it is critical that research examines the link between SMS and IPV perpetration using methods (e.g., intensive longitudinal, experimental) that allow for the assessment of the temporal and proximal association between sexual stigma experiences, SMS, and aggression before concluding that SMS is a contributing cause of SMS-related IPV perpetration.

### **1.3 Overview of the Study and Hypotheses**

Sexual minorities' perpetration of IPV is an understudied phenomenon that, due to its intersection with myriad public health problems, likely has a major impact on their experience of SMS-related health disparities. Though existent research provides support for an association between SMS and IPV perpetration (e.g., Longobardi & Badenes-Ribera, 2017; Stephenson & Finneran, 2017), the proximal and temporal effects between SMS and IPV perpetration have yet

to be explored. As such, this investigation examined cognitive and affective mechanisms of SMS-related aggression postulated by minority stress theory (i.e., Hatzenbuehler, 2009; Mink et al., 2014) within an interactional GAM framework. Importantly, the investigation directly addressed weaknesses of prior cross-sectional SMS-related IPV research by harnessing the complementary strengths of causal inference modeling and a novel application of experimentally elicited SMS to predict SMS-related aggression via a behavioral paradigm. Notably, this behavioral paradigm assessed actual perpetration of cyberaggression (a particularly distressing phenomenon for sexual minority individuals [Bauman & Baldasare, 2015]) as a proxy for participants' propensity for IPV perpetration. These well-established and validated methods are the gold standards for establishing temporal associations among risk factors and aggression perpetration and provide clear and validated operational definitions of interpersonal cyber aggression perpetration and state sexual minority stress.

In Aim 1, the proximal and temporal association between induced SMS and aggression perpetration was assessed utilizing a validated experimental SMS induction procedure and cyber aggression behavioral paradigm (Hypotheses 1 & 2). The SMS induction procedure manipulated participants' exposure to either sexually stigmatizing (SMS Condition) or non-stigmatizing imagery (General Stress Condition). Cyber aggression was assessed via the Taylor Aggression Paradigm (Taylor, 1967) derived TAP-Chat (Burt, Kim, & Alhabash, 2020). This Aim sought to determine whether the acute experience of SMS, relative to an acute experience of general stress, leads to heightened perpetration of cyber aggression. In Aim 2, the potential pathways (i.e., cognitive and affective) that purportedly mediate the association between SMS and cyber aggression perpetration were explored (Hypotheses 3 & 4). Within these two aims, the following hypotheses were advanced:

**Hypothesis 1.** Individuals in the SMS condition will experience greater SMS – as operationalized by increases in negative affect and cognitive rumination – than those in the General Stress condition.

**Hypothesis 2.** Individuals in the SMS condition will display higher levels of aggression perpetration than those in the General Stress condition.

**Hypothesis 3.** Negative affect will mediate the association between the SMS condition and aggression perpetration, such that exposure to sexually stigmatizing (SMS condition), relative to generally stressful (General Stress condition), imagery will be positively associated with increased aggression perpetration via increases in negative affect.

**Hypothesis 4.** Rumination will mediate the association between SMS condition and aggression perpetration, such that exposure to sexually stigmatizing (SMS condition), relative to generally stressful (General Stress condition), imagery will be positively associated with increased aggression perpetration via increases in rumination.

Additionally, in order to better understand the real-world implications of SMS-related aggression and its potential link to IPV perpetration, the association between cyber aggression perpetration derived from the TAP-Chat and individual's propensity to perpetrate IPV was assessed. Given the striking public health problem of IPV among SGM couples (Edwards, Sylaska, & Neal, 2015), understanding the degree to which SMS is associated with a propensity for general aggression perpetration is posited to be a proxy for how SMS may be related to IPV perpetration (Hypothesis 5). Indeed, IPV perpetration among sexual minority couples may be fueled by many of the same processes as general aggression in this population (e.g., SMS resultant elevations in negative affect).



*Hypothesis 5.* Cyber aggression perpetration as assessed via the TAP-Chat will positively correlate with self-reported frequency of past-year IPV perpetration.

## 2 METHOD

### 1.4 Participants

Participants were 132 individuals recruited from February 2-24, 2021. However, a final sample of  $n = 110$  was retained for analyses following the removal of participants who did not identify as cisgender ( $n = 5$ ), were not successfully deceived ( $n = 6$ ), or who did not pass response validity checks ( $n = 11$ ). Response validity checks included assessments of reCAPTCHA scores, timed-out responses, repeated key demographic questions, systemic lack of responding, and pertinence of responses to open-ended questions. Please see Table 1 for sample demographics. Participants (52% women) were on average 23 years old, had completed 15 years of education, 46% were currently enrolled in a college or university at time of participation, and 68% were in a serious relationship (20% currently single, 10% dating casually, and 2% other) with an average relationship length of 3.5 years. Most participants identified as non-Hispanic/non-Latinx (76%), white/Caucasian (72%; 9% African-American, 7% mixed race, 3% Arabic/North African, 3% Asian, 1% Native American/Alaskan, 5% Other), and bisexual (59%; 22% gay, 9% lesbian, 5% questioning, 3% pansexual, 2% queer).

### 1.5 Recruitment and Eligibility Criteria

Individuals were recruited from an online research pool administered by CloudResearch (formerly MechanicalTurk prime, <https://www.cloudresearch.com/>). Members of the research pool tentatively meeting eligibility criteria had the online study link and a very brief study description (hosted by Qualtrics) disseminated to them via CloudResearch. Interested participants who clicked the online link (which could only be opened on a computer, not

smartphone/tablet) were directed to complete a brief questionnaire to determine eligibility. To be eligible, respondents had to endorse U.S. residency, identify as cisgender (their self-identified gender matches their sex assigned at birth) and as a sexual minority (identify as lesbian, gay, bisexual, or another sexual minority identity). Gender minorities were excluded to minimize the likelihood of confounding gender minority stress and sexual minority stress. Further, participants had to endorse having been in an intimate relationship sometime in the past year. Additionally, they had to have been between the ages of 18 and 25, as individuals younger than 18 and older than 25 likely may experience their sexual minority identities and resultant experiences (e.g., stigma) differently than current young adults (Vale, Pasta, & Bisconti, 2019). Lastly, respondents had to endorse the use of a computer (e.g., not smartphone, tablet) that had an attached physical keyboard (further verified when they clicked the study link which is only accessible via a computer), be in a private and distraction-free environment for up to two hours, and be able to read at or above an eighth-grade level. Upon meeting eligibility requirements, participants were directed to continue participating online. Study participants were compensated by CloudResearch per their internal compensation structure. The study procedures were approved by the university's Institutional Review Board.

## **1.6 Experimental Design**

The investigation utilized a 2 (stress induction: SMS, General Stress) x 3 (measurement timepoint: Time 1, Time 2, Time 3) between-within mixed design. Participants were randomly assigned to one of two groups: (1) an SMS induction ( $n = 54$ ), or (2) a General Stress induction ( $n = 56$ ). In order to assess the effect of the stress induction task on aggression without any priming effects, no mention of stigma or sexual orientation was made prior to the completion of the aggression task. Thus, “state” sexual minority stress was not directly assessed. Rather, the

effect of the experimental stress induction on “state” sexual minority stress was evaluated indirectly via differences in negative affect and cognitive rumination between the two groups.

### **1.7 Stress Induction Task**

The stress induction task (Mereish & Miranda, 2019) was used to induce stress related to sexual stigma in sexual minority individuals. In this task, participants in each study condition (i.e., SMS, General Stress) viewed 14 color images presented via an automated slideshow component within the online study module. Images were obtained from online media and selected to ensure that images in each of the two stress induction conditions were balanced with regard to the number of faces, news items, signs, scenes, and type of trauma depicted. The SMS slideshow included photographs of hate crime scenes, victims of sexual stigma-based violence, and individuals holding heterosexist signs. The General Stress slideshow included images of harassment, victims of violence, and news reports of general interpersonal aggression without any mention or depiction of sexual stigma.

The task has been shown to generate significantly greater increases in negative affect in those individuals exposed to its sexually stigmatizing images compared to generally stressing (non-sexually stigmatized) images ( $\beta = .658, p < .01.$ , Mereish & Miranda, 2019). Elicitation of SMS via this task is also associated with increased alcohol craving (Mereish & Miranda, 2019).

### **1.8 Aggression Task**

A modified and validated version of the original *Taylor Aggression Paradigm* (TAP; Taylor, 1967), the *TAP-Chat* (Burt, Kim, & Alhabash, 2020), was used to measure cyber aggressive behavior. The task is presented as an ostensible reaction time competition (embedded within a Qualtrics survey) in which participants compete virtually against a (fictitious) opponent. As a part of the competition, derogatory written instant messages or “chats” are ostensibly

received from and sent to the fictitious opponent. Each participant's messages within a single trial were coded as a "chat" on a scale from "0" (not aggressive) to "5" (extremely aggressive) by three independent raters to quantify the aggressivity of participants' chats. Intraclass correlation analyses examining interrater reliability (assessed via a two-way mixed effects model; Koo & Li, 2016) evidenced good (.75-.90) or excellent ( $\geq .90$ ) absolute agreement between raters across all TAP-Chat trials. This measure of cyber aggression has demonstrated concurrent and convergent validity with other measures of cyber and physical aggression (Burt et al., 2020). Cyberaggression was operationalized as follows (see Appendix B: Table 2 for complete descriptive statistics for the sample's TAP-Chat scores):

***Mean Chat Aggression.*** This measure comprises the average aggressivity rating of messages across all trials.

***Maximum Chat Aggression.*** This measure comprises the maximum level of aggression in any chat within participants.

***Proportion of Chats with Swearing.*** This measure comprises a total count of trials containing swear words (e.g., f\*ck, d\*mn, etc.; range [0-24]) present across all 24 trials of each participant. The total score is then divided by 24 to arrive at a decimal integer representing the proportion of trials containing swear words for each participant (range 0-1).

## **1.9 Materials**

***Demographic form.*** This form (see Appendix E) obtains information such as age, self-identified sexual orientation, gender identity, sex assigned at birth, race, ethnicity, relationship status, past year relationship history, and years of education.

***Positive and Negative Affect Schedule – Momentary (PANAS).*** The PANAS – Momentary (Watson, Clark, & Tellegan, 1988; see Appendix F) consists of 20 mood descriptors

that comprise a 10-item Positive Affect (e.g., interested, proud) and 10-item Negative Affect (e.g., jittery, upset) subscale. Respondents rate the extent to which they are experiencing each mood descriptor *in the present moment* on a scale from 1 (*very slightly/not at all*) to 5 (*extremely*). Higher scores indicate more affect. Negative affect was operationalized by the total sum derived from the 10-item negative affect subscale. This scale has shown adequate convergent validity to other measures of negative affect states (Watson et al., 1988) and strong internal consistency for the momentary version ( $\alpha = .85$ ). In the current sample, the PANAS negative affect subscale demonstrated strong reliability at the first ( $\alpha = .92$ ), second ( $\alpha = .93$ ), and third ( $\alpha = .92$ ) administrations.

***State Rumination Instrument (SRI)***. Given the lack of validated state rumination instruments, a 4-item SRI (see Appendix G) was designed to measure cognitive rumination related to the stress induction task. This self-report measure was developed in accordance with the approaches and item roots used in relevant past research (Key, Campbell, Bacon, & Gerin, 2008; Puterman, DeLongis, & Pomaki, 2010). Rumination items consist of questions assessing participants' endorsement of thinking of and being affected by their thoughts on the stress induction. Example items include "Are you finding it difficult to stop thinking about the images you just viewed?" and "Does thinking about the images make them seem worse?" Responses were recorded on a Likert-type 0-4 scale (i.e., "0" = *not at all* – "4" *very much*) with a total score range from 0-16. Higher total scores indicate greater cognitive rumination in response to the stress induction.

This novel instrument demonstrated sound psychometric properties supporting its utilization as a measure of cognitive rumination. Confirmatory factor analyses estimated utilizing Mplus v8.3 (Muthén & Muthén, 1998-2019) provide strong evidence for the posited factor

structure of the SRI. A single factor solution (capturing the construct of cognitive rumination) fit the data very well at both time points (Time 2:  $\chi^2 = 2.273$ ,  $df = 2$ ,  $p = 0.321$ ; CFI = 0.999, SRMR = 0.009, RMSEA = 0.035 [0.000, 0.196] and Time 3:  $\chi^2 = 2.186$ ,  $df = 2$ ,  $p = 0.335$ ; CFI = 0.999, SRMR = 0.012, RMSEA = 0.029 [0.00, 0.194]) and supports the SRI's use of all four items to capture the construct. The SRI also demonstrated strong internal reliability at Time 2 ( $\alpha = .93$ ) and Time 3 ( $\alpha = .94$ ). The SRI total scores at both timepoints also evidenced normal distributions (Time 2: *Skewness* = .246, *Kurtosis* = -.941; Time 3: *Skewness* = 1.063, *Kurtosis* = .278).

***Daily Heterosexist Experiences Questionnaire (DHEQ)***. The DHEQ (Balsam, Beadnell, & Molina, 2013; see Appendix H) is a measure of external sexual minority stress, which was administered to include as a covariate in analyses if necessary. The DHEQ is a self-report measure comprised of 50-items that capture heterosexist experiences (e.g., "Hearing someone make jokes about LGBT people"). Participants respond as to whether they have encountered each heterosexist experience and how much it affected them on a 0-5 scale (i.e., "0" = *did not occur to me/not applicable* – "5" = *occurred to me and bothered me extremely*). Total scores range from 0-250, with higher total scores indicating greater external sexual minority stress. The DHEQ has historically demonstrated strong internal consistency ( $\alpha = .92$ ) as was also demonstrated in the current sample ( $\alpha = .97$ ).

***Revised Internalized Homophobia Scale (IHS-R)***. The IHS-R (Herek, Gillis, & Cogan, 2009; see Appendix I, J) is a measure of internal sexual minority stress, which was administered to include as a covariate in analyses if necessary. This instrument is comprised of five-items that measure participants' level of negative attitudes toward their own sexual orientation and desire to conform to heterosexuality. Participants rate statements such as "I would like to get professional help to change my sexual orientation from lesbian/bisexual to straight (for women participants)"

on a scale of “1” (*disagree strongly*), to “5” (*agree strongly*). Total scores range from 5-25, with higher total scores indicating greater internalized sexual minority stress. This measure has male and female versions. Thus, participants complete the version based on their self-reported sex assigned at birth. The measure has demonstrated good internal consistency ( $\alpha = .82$ ) as was also evidenced in the current sample ( $\alpha = .89$ ).

***Buss-Perry Aggression Questionnaire (BAQ)***. The BAQ (Buss & Perry, 1992; see Appendix K) is a self-report questionnaire that measures dispositional aggression, which was administered to include as a covariate if necessary in analyses. This 29 item questionnaire contains four subscales: Anger (seven items, e.g., “When frustrated, I let my irritation show”), Physical Aggression (nine items, e.g., “I have become so mad that I have broken things”), Verbal Aggression (five items, e.g., “I tell my friends openly when I disagree with them”), and Hostility (eight items, e.g., “I am suspicious of overly friendly strangers”). Participants rate items on a 1 (*extremely uncharacteristic of me*) to 5 (*extremely characteristic of me*) scale, with higher scores reflecting increased propensity for aggression. The Cronbach’s alpha for the total score is 0.89, with Cronbach’s alphas of the four subscales ranging from 0.72 to 0.85 (Buss & Perry, 1992). The verbal aggression subscale score will be included as a covariate in analyses if necessary, as this subscale is the closest proxy for participants’ use of aggression in the form of derogatory messages sent to opponents. The verbal aggression subscale demonstrated adequate internal consistency in the current sample ( $\alpha = .76$ ).

***Sexual and Gender Minority - Conflict Tactics Scale - 2 (SGM-CTS2)***. The SGM-CTS2 (Dyar, Messinger, Newcomb, Byck, Dunlap, & Whitton, 2019; see Appendix L) is a modified version of the original CTS2 (Straus, Hamby, Boney-McCoy, & Sugarman, 1996) adapted to be appropriate for sexual and gender minority individuals. The SGM-CTS2 was utilized to assess

IPV perpetration in romantic relationships reported during the past year. The SGM-CTS2 is a 74-item self-report instrument that measures a range of behaviors that occur during disagreements within intimate relationships across five separate subscales, including physical violence, psychological violence, injury, sexual coercion/violence, and negotiation. Responses may range from 0 (*never in the last year*) to 6 (*more than 20 times in the last year*), and the frequency of behavior on each subscale is calculated by adding the midpoints of the score range for each item to form a total score. For example, if a participant indicates a response of “3–5” times in the past year, a score of “4” would be assigned.

The current study utilized participants’ self-reported frequency of physical (twelve items, e.g., “I threw something at my partner that could hurt”) and psychological (eight items, e.g., “I destroyed something belonging to my partner”) IPV perpetration, as these SGM-CTS2 subscales assess constructs most relevant to the form of aggression perpetration assessed by the TAP-Chat. The SGM-CTS2 physical and psychological violence perpetration subscales have demonstrated good reliability (psychological:  $\alpha = .82$ ; physical:  $\alpha = .88$ ) (Dyar et al., 2019). In the current sample the physical aggression perpetration subscale evidenced strong internal consistency ( $\alpha = .90$ ) as did the psychological aggression perpetration subscale ( $\alpha = .88$ ). The two perpetration total scores had non-normal distributions (*Skew* = 3.49 – 4.51, *Kurtosis* = 12.92 – 22.17), limiting their use for traditional frequentist statistics which assume normality. As such, both variables were natural log transformed resulting in more acceptable distributions (*Skew* = .398 – 2.25, *Kurtosis* = -.459 – 4.23). The transformed variables were utilized in analyses instead of the original scores as appropriate.

***Cognitive Interview (CI).*** Cognitive interviews are a valuable qualitative methodology used to provide support for traditionally collected quantitative data and are particularly adept at



examining sequences of events retrospectively that may be at risk for issues in memory recall (Ryan, Gannon-Slater & Culbertson, 2012). In the present study, open-ended questions (see Appendix O) were designed to evaluate participants' effort on the aggression task (as well as a manipulation check), evaluate the validity of the stress induction, and assess their thoughts and feelings in retrospective temporal order as they proceeded through the tasks. Participants' written responses on the online cognitive interview were analyzed for evidence of the validity and effects of study procedures.

### **1.10 Procedures**

Please see Appendix P for a succinct outline of study procedures and timeline. Upon opening the study weblink, respondents were presented with the informed consent document. Upon providing consent, participants completed the online demographic packet including the eligibility screener questions. For participants deemed ineligible based on the eligibility screener, participation ended immediately. Eligible participants then proceeded to complete the PANAS (Time 1; Pre-stress induction).

Next, participants were provided with a general overview of the sequence of procedures, followed by instructions specific to the stress induction task and TAP-Chat. In order to convince participants that they were actually competing against another person, they were told that another study participant "like them" was their opponent during the reaction time task. In order to further increase the likelihood of successful deception, if participants at any time sent a chat with the word "bot" or "robot" appearing, the software automatically responded with a "lol...u real?!" and other short quips, though Burt et al. (2020) found that participants who questioned the veracity of their opponents still completed the task similarly to deceived participants.

Instructions for the aggression task were provided via a virtual tutorial and practice session that highlighted gameplay and the chat feature (see Figure 1 below). The instructions stated *“You will be participating later in a reaction time task in which you will play against another player, your co-player, another participant in this study. Your task will be to click a target as fast as possible when it changes color from yellow to red. The goal is to be faster than your co-player. You will be able to chat with your co-player if you wish. Click the next button to see an overview of the game set-up.”* Using step by step screenshots and a mock trial of the game, participants were taught that a green ball will indicate the system has reset for a new trial of the game, a yellow ball signals that the participant has clicked the “READY” box indicating they are ready to respond and that the opponent is also ready, and a red ball indicates to click the target on screen (the ball) as fast as possible.



Figure 1. TAP-Chat "Reaction time game" tutorial window.

It was indicated on-screen if the participant won or lost a trial. A chat dialog box was present throughout the game in the lower right-hand corner of the screen and “pinged” participants when they sent a new message or when their ostensible co-player sent a new

message to them. Participants were able to send chats to their opponents at any time throughout the game, were allowed to not respond at all, and were especially prompted after winning trials (chat box “pinged”). Upon losing a trial, participants received a derogatory message from their ostensible opponent, but at no other times.

Following the explanation of study procedures, participants completed the stress induction task. At the start of the task, participants were instructed to sit quietly and face the computer screen. At the start of the slideshow, participants were instructed to watch the images for the entire time they were presented and imagine they are the victims of the negative events depicted on screen. At the start of each condition’s slideshow, an orientation slide initiated each group of images. In the SMS condition, the orientation slide stated: *“The following pictures show real life events that involved discrimination, harassment, or violence against lesbian, gay, bisexual, and queer people.”* In the General Stress condition, the orientation slide stated: *“The following pictures show real life events that involved negative events, harassment, or violence against heterosexual people.”* Following the orientation slide, each of the 14 images were shown separately for 10 seconds. Each image was automatically succeeded by the next without a delay between images.

Immediately afterward, the PANAS and SRI (Time 2) were administered. Upon completion of these measures, there was a 60 second delay during which the participant was ostensibly waiting while an opponent “was connected” (indicated by a landing page with an “waiting for other player” indicator). After this delay, participants proceeded directly into the aggression task. The entire aggression task consisted of 24 consecutive trials (not including a “Trial 0” period of time during which participants can send chats once the TAP-Chat game utility has opened but before the first reaction time trial occurs and before any messages are

received from the opponent). Participants lost 50% of trials in a fixed, random order (starting with a loss on Trial 1). On losing trials, participants received increasingly derogatory messages from their ostensible opponent that ranged from neutral (Trial 1, “lol sup?”) to low provocation (Trials 2-13, “U just reminded me I need to take out my garbage”) to high provocation (Trials 14-24, “you SUCK at this game!”). In actuality, reaction times were not measured. All participants received the same sequence of provocation levels and chats.

Following the aggression task, participants completed the PANAS and SRI (Time 3). Afterwards, participants completed the cognitive interview. Following the cognitive interview, participants completed the DHEQ, IHP-R, BAQ, and SGM-CTS2. Lastly, participants were directed through a debriefing procedure including a full debriefing via a pre-recorded video that described the study’s aims (e.g., this study sought to understand the association between sexual minority stress and aggression) and also included answers to commonly asked questions (e.g., messages during the game were not sent by a real person and they were not competing against a real person). After this debriefing, participants completed a positive mood induction task. In this task, participants listened to an audio recorded psycho-somatic guided relaxation modeled on procedures used by Cruess and colleagues (2015). Finally, participants completed a Post-Debriefing Survey (Parrott, Miller, & Hudepohl, 2015) that assessed distress and propensity to act aggressively following engagement in behavioral aggression task (PDS; see *Appendix N*). Resources were provided to any participant who endorsed the continued experience of significant distress or discomfort or who requested that they receive such resources. Following these debriefing procedures, the online study module closed.

### 3 RESULTS

An a priori Monte Carlo analysis (utilizing Mplus v8.4 [Muthén & Muthén, 1998-2019]) suggested a minimum sample size of 104 individuals would be sufficient to detect significant direct and indirect effects of two parallel mediators, the most statistically demanding analysis of the investigation. The Monte Carlo parameter estimates were gathered from published literature mirroring the methods and constructs/variables utilized herein. The model estimates were replicated (akin to a bootstrap method) 10,000 times to produce robust parameter estimates. Specifically, the hypothesized model evaluated the conditional indirect effects of two parallel mediators (i.e., cognitive and affective) on the association between a dichotomous predictor (i.e., stress induction: SMS, General Stress) and a continuous outcome (i.e., aggression) utilizing a model developed by Thoemmes, MacKinnon, & Reiser (2010). This approach to power analysis (utilizing a Monte Carlo specifying the mean and covariance structure of the data) provided the most precise and robust estimates for an a priori estimate of the required sample size.

#### 1.11 Preliminary Analyses

**Group Differences.** Before proceeding with analyses of the hypothesized effects, the study groups (dummy coded 0 = General Stress condition, 1 = SMS condition) were examined for any significant differences on demographic variables, external and internal sexual minority stressors, and dispositional aggression to verify that random assignment procedures worked. A series of independent samples *t*-tests did not detect any significant group differences in demographic characteristics (see Table 1) including Age,  $t(108) = 1.104, p = .272$ , Years of Education,  $t(108) = .143, p = .886$ , and Length of Current Relationship,  $t(89) = .035, p = .972$ . A series of independent samples *t*-tests also failed to detect any significant group differences (see Table 2) in external SMS,  $t(104) = -.557, p = .579$ , internal SMS,  $t(108) = .032, p = .975$ , and

dispositional verbal aggression,  $t(107) = -.282, p = .778$ . Collectively, these findings indicate that experimental groups did not significantly differ on relevant variables. As such, none of these variables were included as covariates in subsequent analyses.

**Aggression Checks.** Overall, 83% of participants sent at least one chat during the aggression task. Inspection of the data revealed no differences in interaction rates on the TAP-Chat by study condition. On average, a given TAP-Chat trial elicited responses by 24.1% of participants, with the fewest participants responding to Trial 19 (16.4% of participants) and the most participants responding to Trial 1 (48.2%).

## 1.12 Hypotheses Testing

**Hypothesis 1.** In order to determine if individuals in the SMS condition experienced greater SMS – as operationalized by increases in negative affect and cognitive rumination – than those in the General Stress condition, a series of analyses were computed comparing the study groups. In order to determine if individuals in the SMS condition experienced greater negative affect than those in the General Stress condition, a 2 (Condition) x 2 (Time) mixed model ANOVA was computed with time as the repeated measure and the change in negative affect (T1 to T2) as the dependent variable. Analyses indicated that participants' self-reported negative affect significantly increased from T1 ( $M = 13.41, SD = 5.85$ ) to T2 ( $M = 23.05, SD = 9.72$ ),  $F(1,101) = 106.60, p < .001, \eta_p^2 = .513$ . This effect was not moderated by participants' condition assignment,  $F(1,101) = 0.329, p = .567, \eta_p^2 = .003$ . Second, an independent samples  $t$ -test was computed comparing T2 cognitive rumination scores between the study groups to determine if individuals in the SMS condition experienced greater rumination than those in the General Stress condition. Results indicate no significant difference between the groups,  $t(104) = -.901, p = .370, d = .175$ .

Additionally, in order to examine if changes in stress were sustained beyond the TAP-Chat, a 2 (Group) x 2 (Time) mixed model ANOVA was computed examining changes between T2-T3 negative affect scores. This model detected a significant decrease in negative affect from Time 2 ( $M = 23.05$ ,  $SD = 9.72$ ) to Time 3 ( $M = 18.39$ ,  $SD = 8.89$ ),  $F(1,101) = 46.025$ ,  $p < .001$ ,  $\eta_p^2 = .313$ ; however, this change was not moderated by participants' condition assignment,  $F(1,101) = 1.550$ ,  $p = .216$ ,  $\eta_p^2 = .015$ . A 2 (Group) x 2 (Time) mixed model ANOVA examining changes between T2-T3 cognitive rumination scores also detected a significant decrease from Time 2 ( $M = 11.55$ ,  $SD = 4.77$ ) to Time 3 ( $M = 8.69$ ,  $SD = 4.69$ ),  $F(1,104) = 67.287$ ,  $p < .001$ ,  $\eta_p^2 = .393$ . This decrease was significantly moderated by group condition,  $F(1,104) = 4.034$ ,  $p = .047$ ,  $\eta_p^2 = .037$ . Analysis of relevant simple main effects utilizing independent samples  $t$ -tests demonstrates that at Time 2 there was no significant difference in cognitive rumination scores between the General Stress condition ( $M = 11.15$ ,  $SD = 4.40$ ) and the SMS condition ( $M = 11.98$ ,  $SD = 5.14$ ),  $t(104) = -.901$ ,  $p = .37$ ,  $d = .175$ . However, results evidenced individuals in the General Stress condition ( $M = 7.47$ ,  $SD = 4.00$ ) had significantly lower cognitive rumination scores at T3 compared to those in the SMS condition ( $M = 10.00$ ,  $SD = 5.06$ ),  $t(104) = -2.864$ ,  $p = .005$ ,  $d = .557$ .

Lastly, a 2 (Group) x 2 (Time) mixed model ANOVA examining changes between T1-T3 negative affect scores detected a significant increase across from Time 1 ( $M = 13.41$ ,  $SD = 5.85$ ) to Time 3 ( $M = 18.39$ ,  $SD = 8.89$ ),  $F(1,101) = 36.539$ ,  $p < .001$ ,  $\eta_p^2 = .266$ ; however, this increase was not moderated by group condition,  $F(1,101) = 0.004$ ,  $p = .951$ ,  $\eta_p^2 < .001$ .

Thematic analyses of participants' responses on the Cognitive Interview support this pattern of findings. In response to questions asking about their thoughts and feelings during the stress induction, participants in both study conditions described negative emotions in response to

the images (e.g., “gut wrenching, sad, pretty shocking, I felt as if I was actually experiencing...myself”). Participants also described negative thoughts (e.g., “thinking how horrible this is” and “I imagined them happening to someone I know”). Participants in the SMS condition also described their own experiences and fears (e.g., “I hate seeing what people do to folks like me”, “It made me nervous to think about myself in the person’s position”, “The images were quite distressing and a huge reminder that there are homophobic individuals...who pose a great threat to my safety”). Despite the stress induction’s demonstrated efficacy in eliciting negative affect and thoughts, participant reports suggest that these effects were lost during the course of the TAP-Chat. When asked if they were still thinking of the images and how the images may have been affecting them at the start, midpoint, and end of the TAP-Chat, nearly all participants endorsed meaningful decreases in thinking of the images. In fact, many reported no longer thinking about the images altogether. Participants described some lingering feelings of negative affect/cognitions at the start of the TAP-Chat, but many also verbalized a cognitive pivot starting the aggression task as, “I was glad to have a new task, I was planning on how to win/do well, I was still thinking a bit about the pictures, but mostly I was focused on the new task.” By the midpoint and especially at the end of the TAP-Chat, participants were responding nearly exclusively about the antagonistic messaging of their ostensible opponent without mention of the stress induction task. At the final question following the TAP-Chat’s completion asking if they were still thinking of the images/their feelings, one participant summed up most responses when they wrote, “Honestly, I can’t even remember most of them.” However, a few participants were still reminded of what they had seen with one participant reporting, “I’m not really thinking of the images [right now] ...They are in the back of my mind though.”

Collectively, these results fail to support Hypothesis 1.



**Hypothesis 2.** In order to determine if individuals in the SMS condition perpetrated greater levels of aggression than those in the General Stress condition, a MANOVA was computed examining group differences on the outcome variables of TAP-Chat mean chat aggression, maximum chat aggression, and proportion of swearing. The model evidenced no significant effect of group assignment on TAP-Chat mean chat aggression,  $F(1,110) = 0.759$ ,  $p = .386$ ,  $\eta_p^2 = .007$ , maximum chat aggression,  $F(1,110) = 1.319$ ,  $p = .253$ ,  $\eta_p^2 = .012$ , and proportion of swearing,  $F(1,110) = 0.606$ ,  $p = .438$ ,  $\eta_p^2 = .006$ . These results fail to support Hypothesis 2.

Additionally, in order to better understand the potential effect of study condition on aggression trajectories, individuals' TAP-Chat aggression scores on each trial over the span of the aggression task were examined utilizing specially tailored latent growth curve models. These models included each participant's TAP-Chat score on each of the 24 trials and also initially included the "Trial 0" chats to assess whether aggression trajectories were anchored by these initial, unprovoked chats.

As may be seen in Figure 2, there was no clear overall positive trajectory in aggression perpetration across the 25 observation time points when visually inspecting the data. This suggests the TAP-Chat did not elicit increased perpetration across the increasing provocation levels as intended. Indeed, a pairwise  $t$ -test revealed no statistically significant difference between TAP-Chat mean aggression scores from the low provocation phase ( $M = 1.02$ ,  $SD = 2.52$ ) to the high provocation phase ( $M = 1.37$ ,  $SD = 2.91$ ),  $t(109) = -1.558$ ,  $p = .122$ ,  $d = .149$ . Furthermore, visual inspection and comparison of Figures 3 and 4 suggest there was no meaningful difference in aggression perpetration trajectories between the study groups.

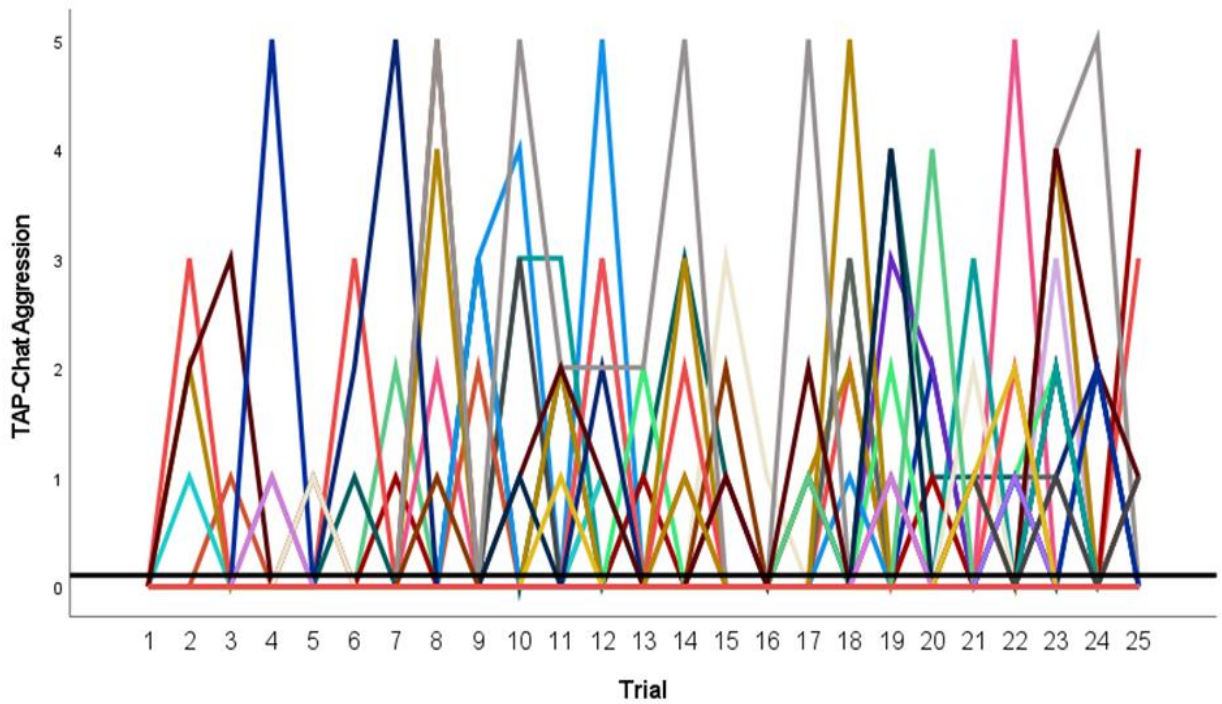


Figure 2. Spaghetti plot of individual TAP-Chat aggression trajectories in the full sample ( $N = 110$ ). Note. The black line represents the grand mean. Trial 1 = Trial 0 in the task.

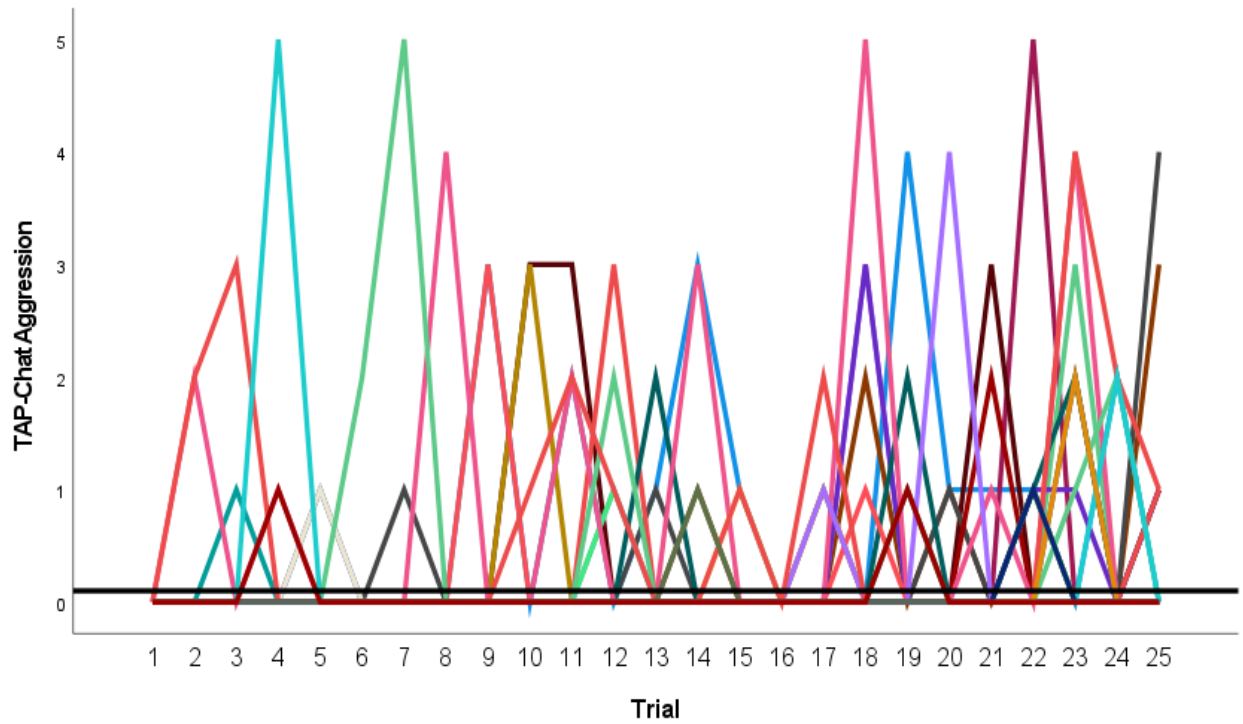


Figure 3. Spaghetti plot of individual TAP-Chat aggression trajectories in the General Stress condition ( $N = 56$ ). Note. The black line represents the grand mean. Trial 1 = Trial 0 in the task

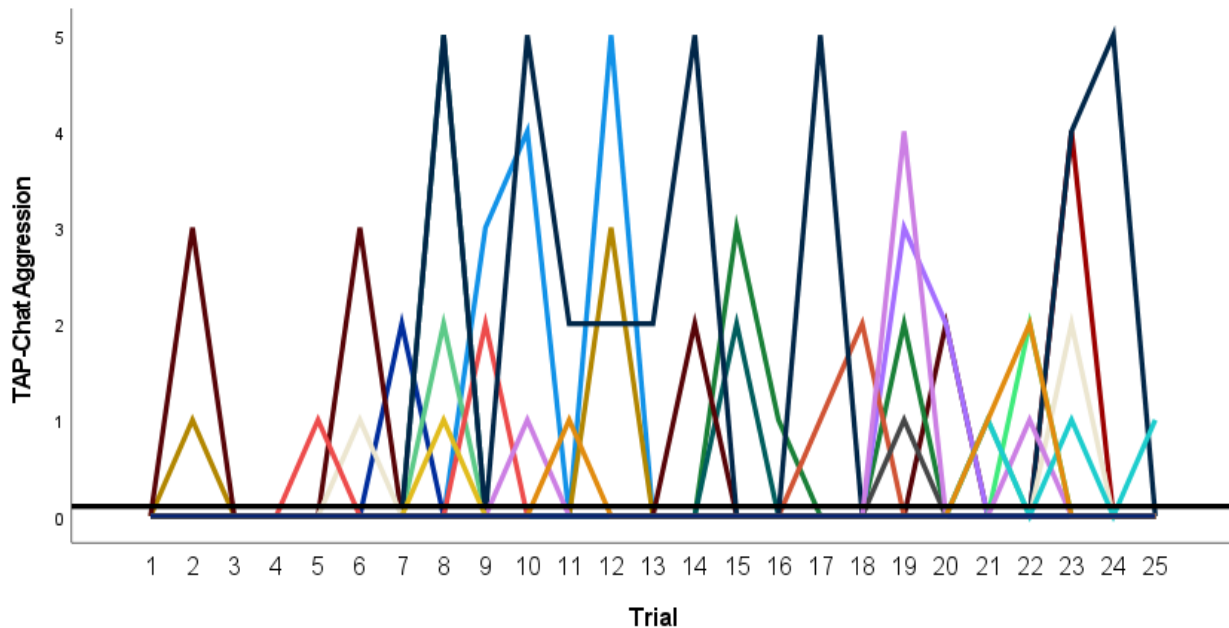


Figure 4. Spaghetti plot of individual TAP-Chat aggression trajectories in the SMS condition ( $N = 54$ ). Note. The black line represents the grand mean. Trial 1 = Trial 0 in the task.

A preliminary Linear growth model (assuming linear growth in aggression trajectories) was constructed utilizing the full sample (irrespective of study condition) using diagonally weighted least squares estimation (WLSMV; adjusting estimates for the categorical nature of the data) using Mplus v8.3 (Muthén & Muthén, 1998-2019). This initial model imposed the simplest traditional growth framework on the data. Initial models failed to converge due to model estimation difficulties encountered. As such, an increase in the maximum number of model iterations and the successive addition of residual constraints along with a successive series of cross-lagged covariances were employed to aid estimation together with the use of start values. Initial partially estimated models revealed no variance in scores at Trial 0 which in turn was subsequently dropped from further models to aid estimation and construct a more parsimonious model.

Unsurprisingly, as suggested by Figure 2, the initial Linear growth model failed to estimate properly. Both the latent factor and residual covariance matrices were not positive definite. This likely was due to a very low variance and a very low mean in scores at each Trial, which also resulted in very high correlations amongst Trials. In response, a more flexible Latent Basis growth model was next estimated which did not impose an overall slope on the data, rather allowing trajectories to increase (or not) after an initial starting slope between the first two Trials. This model also failed to properly estimate utilizing the same successively supporting aids for estimation as described earlier. Lastly, an Intercept Only model was imposed on the data which assumes no change in scores over time, merely estimating an underlying latent factor and mean structure tying together Trial scores. This model also failed to properly estimate due to the same limitations of the data as described above. As such, more complex growth models comparing study groups and multiple slopes across provocation levels were not pursued. Results of these exploratory analyses further evidence a lack of support for Hypothesis 2.

***Hypothesis 3 and 4.*** In order to determine if negative affect and cognitive rumination mediate the association between the SMS condition and aggression perpetration, parallel mediation models were estimated. Three separate models were estimated for each of the TAP-Chat outcome variables of interest (i.e., mean chat aggression, maximum chat aggression, and percentage of swearing) evaluating the indirect effect of study condition through negative affect (PANAS score at Time 2 controlling for Time 1 PANAS score) (Hypothesis 3) and rumination (SRI score at Time 2) (Hypothesis 4). Bootstrapped direct and indirect effect estimates were assessed to evaluate full and partial mediation utilizing Mplus v8.3 (Muthén & Muthén, 1998-2019).

The association between study condition and TAP-Chat mean aggression was not mediated (fully or partially) by negative affect or cognitive rumination. The regression coefficient between study condition and TAP-Chat mean aggression was not statistically significant,  $b = -0.046$ ,  $p = .214$ . The regression coefficient between study condition and negative affect was not statistically significant,  $b = 3.40$ ,  $p = .061$ , as was the regression coefficient between negative affect and TAP-Chat mean aggression,  $b = 0.006$ ,  $p = .109$ . The regression coefficient between study condition and cognitive rumination was not statistically significant,  $b = .833$ ,  $p = .368$ , as was the regression coefficient between cognitive rumination and TAP-Chat mean aggression,  $b = -0.005$ ,  $p = .312$ . The significance of the total direct and indirect effects was tested using bootstrapping procedures. Unstandardized indirect effects were computed for each of the 10,000 bootstrapped samples, and the 95% confidence interval was computed by determining the indirect effects at the 2.5th and 97.5th percentiles. The bootstrapped indirect effect of negative affect was not significant,  $b = 0.019$ ,  $p = .287$ , CI [-0.003, 0.065]. The bootstrapped indirect effect of cognitive rumination was not significant,  $b = -0.004$ ,  $p = .607$ , CI [-0.026, 0.007]. The bootstrapped total indirect effect was also not significant,  $b = 0.015$ ,  $p = .354$ , CI [-0.008, 0.056]. Finally, the bootstrapped total direct effect was also not significant,  $b = -0.046$ ,  $p = .214$ , CI [-0.118, 0.025].

The association between study condition and TAP-Chat maximum aggression was not mediated (fully or partially) by negative affect or cognitive rumination. The regression coefficient between study condition and TAP-Chat maximum aggression was not statistically significant,  $b = -0.385$ ,  $p = .234$ . The regression coefficient between study condition and negative affect was not statistically significant,  $b = 3.42$ ,  $p = .061$ , as was the regression coefficient between negative affect and TAP-Chat maximum aggression,  $b = 0.019$ ,  $p = .386$ . The regression

coefficient between study condition and cognitive rumination was not statistically significant,  $b = 0.825$ ,  $p = .372$ , as was the regression coefficient between cognitive rumination and TAP-Chat maximum aggression,  $b = -0.03$ ,  $p = .522$ . The significance of the total direct and indirect effects was tested using bootstrapping procedures. Unstandardized indirect effects were computed for each of the 10,000 bootstrapped samples, and the 95% confidence interval was computed by determining the indirect effects at the 2.5th and 97.5th percentiles. The bootstrapped indirect effect of negative affect was not significant,  $b = 0.065$ ,  $p = .483$ , CI [-0.089, 0.0281]. The bootstrapped indirect effect of cognitive rumination was not significant,  $b = -0.025$ ,  $p = .703$ , CI [-0.187, 0.085]. The bootstrapped total indirect effect was also not significant,  $b = 0.04$ ,  $p = .639$ , CI [-0.126, 0.223]. Finally, the bootstrapped total direct effect was also not significant,  $b = -0.385$ ,  $p = .234$ , CI [-1.028, 0.240].

The association between study condition and TAP-Chat proportion of swearing was not mediated (fully or partially) by negative affect or cognitive rumination. The regression coefficient between study condition and TAP-Chat proportion of swearing was not statistically significant,  $b = -0.008$ ,  $p = .308$ . The regression coefficient between study condition and negative affect was not statistically significant,  $b = 3.408$ ,  $p = .061$ , as was the regression coefficient between negative affect and TAP-Chat proportion of swearing,  $b = 0.001$ ,  $p = .215$ . The regression coefficient between study condition and cognitive rumination was not statistically significant,  $b = 0.834$ ,  $p = .366$ , as was the regression coefficient between cognitive rumination and TAP-Chat proportion of swearing,  $b = 0.0001$ ,  $p = .806$ . The significance of the total direct and indirect effects was tested using bootstrapping procedures. Unstandardized indirect effects were computed for each of the 10,000 bootstrapped samples, and the 95% confidence interval was computed by determining the indirect effects at the 2.5th and 97.5th percentiles. The

bootstrapped indirect effect of negative affect was not significant,  $b = 0.003$ ,  $p = .351$ , CI [-0.002, 0.011]. The bootstrapped indirect effect of cognitive rumination was not significant,  $b = 0.00$ ,  $p = .869$ , CI [-0.003, 0.002]. The bootstrapped total indirect effect was also not significant,  $b = 0.003$ ,  $p = .349$ , CI [-0.002, 0.010]. Finally, the bootstrapped total direct effect was also not significant,  $b = -0.008$ ,  $p = .308$ , CI [-0.025, 0.007]. Collectively these results fail to support Hypotheses 3 and 4.

**Hypothesis 5.** In order to assess the association between cyber aggression perpetration on the TAP-Chat and past history of IPV perpetration assessed via the SGM-CTS2, bivariate Pearson correlations were computed between the physical and psychological aggression perpetration subscales of the SGM-CTS2 and the three outcome measures of the TAP-Chat (i.e., mean chat aggression, maximum chat aggression, and proportion of chats with swear words). Results (see Table 3) evidence no significant correlations between either IPV perpetration subscale and any of the three TAP-Chat aggression outcomes. These results fail to support Hypothesis 5.

### 1.13 Post-Debriefing Survey

Following completion of the debriefing and positive mood induction portions of the study procedure, participants completed the post-debriefing survey assessing their study experiences and their effects on their distress and propensity to act aggressively. When asked if they felt they were more, less, or just as likely/unlikely to behave aggressively following study completion, 53.2% of participants reported feeling just as likely/unlikely (43.1% less likely, 3.7% more likely). When asked how distressing it was having to view images depicting violence/harm, 35.8% of participants reported feeling moderately distressed (33.9% somewhat, 20.2% extremely, 10.1% not at all). When asked how distressing it was having to view images depicting



homophobia ... (if applicable), 33% of participants reported feeling moderately distressed (27.4% somewhat, 24.5% extremely, 15.1% not at all). When asked how distressing it was receiving “mean” messages, 34.9% of participants reported feeling somewhat distressed (29.4% not at all, 25.7% moderately, 11.1% extremely). When asked how distressing it was being informed of the fake messaging, 71.3% of participants reported feeling not at all distressed (20.4% somewhat, 7.4% moderately, 0.9% extremely). When asked how distressing it was being informed of deception use, 72.9% of participants reported feeling not at all distressed (20.6% somewhat, 5.6% moderately, 0.9% extremely).

#### **4 DISCUSSION**

The present study failed to support Hypotheses 1-5. Most notably, results did not detect (1) an effect of state SMS on cyber aggression perpetration, or (2) indirect effects of state SMS on cyber aggression perpetration via hypothesized mechanisms of negative affect and cognitive rumination. Collectively, these findings are not interpretable due to two primary methodological concerns. First, the stress induction manipulation failed to differentially induce stress between the two experimental conditions. Second, the TAP-Chat failed to elicit adequate interaction and aggression perpetration by participants. These methodological issues are reviewed more substantively below.

The stress induction manipulation did not induce a higher level of stress in the SMS, relative to the General Stress, condition. Most notably, participants in these conditions did not differ significantly in negative affect or cognitive rumination at Time 2, the key observation time point after the induction and immediately before participation on the TAP-Chat. This outcome is not consistent with past research, which demonstrates that this manipulation reliably induces greater negative affect for participants in the SMS condition compared to the General Stress

condition (Mereish & Miranda, 2019). Thus, the SMS condition manipulation did not evidence a strong enough stress induction in the current sample. Relative to past research, the clear difference and novelty in the current study was the manipulation's online delivery compared to the in-person, laboratory administration used in the validation study. It may be that viewing the images from the presumed comfort of one's home instead of in the laboratory environment decreased the effectiveness of the stress induction.

Despite the manipulation's shortcomings in differentially eliciting negative affect and cognitive rumination at Time 2, results did partially support its effectiveness at Time 3. At Time 3 (post TAP-Chat), despite continued lack of differentiation in negative affect between study groups, cognitive rumination scores were meaningfully greater for participants in the SMS condition compared to the General Stress condition. This suggests that the stress induction may have lasting effects via increased cognitions whereas negative affect decreased by, and did not differentiate either group at, Time 3. Importantly, negative affect at Time 3's assessment may have also been impacted by resultant affect following participation on the adversarial, competitive TAP-Chat. Further, based on the Cognitive Interview, some participants in the SMS condition reported the experience of lingering thoughts about the images they viewed as they were completing the TAP-Chat (e.g., "They are in the back of my mind..."). Indeed, literature suggests that post-stress ruminations may be particularly indicative of maladaptive stress responses (Gianferante et al., 2014) and predict slower recovery from stress (Aldao, McLaughlin, Hatzenbuehler, & Sheridan, 2014). It may be that despite the lack of effects when examining negative affect, the SMS induction carries a longer or delayed effect via changes in cognition, indicating the particular saliency of the SMS condition for sexual minority individuals. The

stress induction's validation study did not assess cognitive rumination, only negative affect changes.

The second important methodological concern was the TAP-Chat's failure to elicit meaningful interaction and aggression perpetration on the task. The failure of this methodology in the present study centers on three important concerns. First, participants did not interact with the task to a meaningful extent. In the current sample, 83% of participants sent at least one message, higher than the TAP-Chat's validation sample (63-73%, Burt, Kim, & Alhabash, 2020). Despite this high overall interaction rate, only about 24.1% of participants sent a message on average on each trial. In fact, there was a noticeable drop in the rate of interactions from the start of the task (48.2% Trial 1) to the end of the task (20.1% Trial 24). This low level of interaction per trial and perceptible drop in participation across trials was also detected in the validation study (S. A. Burt & M. Kim, personal communication, April 21, 2021). Unfortunately, this low level of interaction per trial and drop-off effect was not known prior to the conduction of the present investigation and likely resulted in a power issue due to assuming full participation across all trials. Second, of the small minority of participants who *did* send messages during any one trial, the vast majority of the messages they sent were benign. As shown in Table 2, all three outcome indicators of the TAP-Chat evidenced very low means near zero. In fact, mean maximum aggressivity in the sample hovered at 1.2 out of 5. Further, examination of individual aggression trajectories (Figures 2-4) indicates that a very small handful of participants delivered the majority of messages rated above a 0 level of aggressivity. In fact, examination of Figure 2 demonstrates that of the ten individual "Level 5" messages sent over the duration of the TAP-Chat, five of them were administered by the same one individual. Third, the TAP-Chat failed to elicit increased aggression across the provocation levels as designed (Burt, Kim, & Alhabash,

2020). Despite increasingly derogatory, insulting messages sent from the ostensible opponent, no increase in aggression was detected between provocation levels and across the span of the TAP-Chat. This failure of the TAP-Chat to elicit aggression as designed calls into question the validity of the aggression task in the present study and the interpretability of derived results given the current sample. It is very likely that the completely online modality of the present investigation, compared to the in-person, laboratory delivery of the validation study, greatly affected the manner of interactions with the task. Perhaps the derogatory, increasingly hurtful messages sent by the ostensible opponent across the TAP-Chat trials were less impactful than if they had been participating in-person within research facilities. Collectively, the TAP-Chat's across-the-board failure to elicit a high level of participant engagement and aggression in the current sample calls into question the validity and reliability of the task when delivered remotely and online.

As a result of these methodological concerns, it is difficult – if not impossible – to draw conclusions from the observed null findings and/or situate these null findings within a discussion of the evidence for the postulated SMS-related aggression framework. That stated, several null findings merit attention. Perhaps unsurprisingly, no study group differences were detected in TAP-Chat aggression perpetration. Given the presumption that greater negative affect will predict higher aggression perpetration, and both study groups evidenced similar negative affect (and rumination) levels following the stress induction, it is unsurprising that no study group differences were detected in TAP-Chat perpetration. Similarly, the potential mediating roles of negative affect and cognitive rumination were also not detected given that the SMS induction did not elicit higher negative affect and cognitive rumination in the SMS condition and the TAP-Chat did not elicit meaningful interaction and perpetration rates. In fact, across all mediation models, not a single direct or indirect path was significant. Lastly, it bears mentioning that the

three outcome indicators of the TAP-Chat did not correlate with either psychological or physical IPV perpetration (via SGM-CTS2) as was hypothesized. This is surprising, as both measures assess the underlying construct of aggression and some degree of correlation should be expected. Again, it is likely that the very depressed scores on the TAP-Chat failed to provide adequate variance to properly assess associations between these two indicators of aggression. This calls into question the validity and reliability of the TAP-Chat for assessing aggression when delivered remotely and online. As such, the present data prohibit a discussion of the association between propensity to commit general interpersonal cyber aggression and intimate partner violence perpetration.

#### **1.14 Limitations**

Several limitations of this study merit discussion. First, and most importantly, it is clear that the current online investigation failed to successfully replicate the stress induction's ability to differentially induce stress and the TAP-Chat's ability to elicit aggression. These shortcomings were most likely due to the novel online delivery of these tasks, a first for both. These hurdles suggest that despite the relative ease with which these tasks were delivered online, further validation work is necessary before the tasks can be faithfully administered online. In further focus, the TAP-Chat needs further validation regardless of its modality of delivery as it failed to correlate with the SGM-CTS2. This stands in contrast to its prior significant correlations with self-reported cyber aggression and dispositional aggression (Burt, Kim, & Alhabash, 2020). Second, given the low interaction and aggression rates on the TAP-Chat, the *a priori* power analysis was potentially miss-specified in hindsight. The extant published associations between laboratory-based TAP perpetration and measures of negative affect/cognitive rumination upon which the analysis was built proved to be much higher than the associations observed in the

current investigation. This, together with the incomplete information concerning previously observed participation rates on the TAP-Chat, resulted in a likely underestimation of the sample size required to detect the very small TAP-Chat aggression effects and their associations with negative affect and cognitive rumination. Unsurprisingly, a post-hoc power analysis mirroring the *a priori* model and updated with the current study's estimates revealed the study analyses were severely underpowered to detect significant effects. This model suggested a minimum sample size of approximately 186,100 participants would have been required to have adequately powered (.80) analyses to detect significant mediation effects. This unforeseeable miscalculation undermined the ability of the study analyses to detect significant effects given the sample size. Further research utilizing the TAP-Chat and establishment of its associations with existent psychological instruments will aid the estimation of more sensitive power analyses in future research. Third, the sample was not representative of national demographics and particularly lacked racial diversity in its makeup. As such, these results are limited in their extension to the general U.S. population. Fourth, data collection occurred in February 2021, which marked nearly one-year into the COVID-19 pandemic and was characterized by national political changes. It is possible that this sociopolitical context influenced the perceptions, mood, and experiences of historically stigmatized populations. If so, this potential shift in the national zeitgeist could have tempered the effectiveness of the stress induction task. Lastly, the current investigation failed to account for TAP-Chat resultant negative affect in its measurement of changes in negative affect. It is likely that Time 3 negative affect scores (measured immediately after completion of the aggression task) were sensitive to not only lingering emotions due to the stress induction but also likely were sensitive to the more proximal effects of the competitive, adversarial task featuring derogatory, insulting, and instigating messages. Future research examining changes in affect as

part of an experimental design would do well to carefully assess affect resultant of participation on the TAP-Chat separately from any affect manipulations.

### **1.15 Conclusion**

The current investigation was not able to detect an effect of state SMS on cyber aggression perpetration. Unfortunately, methodological shortcomings in the investigation did not permit insight into the key research aim of exploring SMS-related aggression and its underlying mechanisms. Despite robust empirical support for positive associations between SMS and IPV perpetration (Longobardi & Badenes-Ribera, 2017; Martin-Storey & Fromme, 2021), it remains to be determined whether experiencing acute SMS increases risk for subsequent aggression perpetration or not. Irrespective of the project's null findings, the methodology of the present investigation provides important information on the potential feasibility and limitations of administering the stress induction and TAP-Chat via an online modality. It is hoped that these insights will be informative for the further development and refinement of these tools.

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## APPENDICES

**Appendix A: Table 1***Table 1. Sample Demographics by study condition. (N=110).*

	<i>SMS condition</i>	<i>General Stress condition</i>	<i>Total Sample</i>
Demographic	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Age	22.46 (1.92) <sup>a</sup>	22.84 (1.65) <sup>a</sup>	22.65 (1.79)
Years of education	15.31 (2.49) <sup>a</sup>	15.38 (1.88) <sup>a</sup>	15.35 (2.19)
Length of current relationship*	43.05 (21.59) <sup>a</sup>	43.21 (23.82) <sup>a</sup>	43.13 (22.64)

*Note:* Means in same row with different superscripts differ via an independent samples T-test,  $p < .01$ . \* = months.

**Appendix B: Table 2***Table 2. Means and standard deviations for study variables by study condition. (N=110).*

Variables	<i>SMS condition</i>	<i>General Stress condition</i>	<i>Total Sample</i>
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
PANAS negative affect sum Time 1	12.71 (4.32) <sup>a</sup>	14.02 (6.89) <sup>a</sup>	13.41 (5.85)
PANAS negative affect sum Time 2	24.52 (9.96) <sup>a</sup>	21.76 (9.40) <sup>a</sup>	23.05 (9.72)*
PANAS negative affect sum Time 3	19.24 (8.93) <sup>a</sup>	17.63 (8.85) <sup>a</sup>	18.39 (8.89)*
SRI sum Time 2	11.98 (5.14) <sup>a</sup>	11.15 (4.40) <sup>a</sup>	11.55 (4.77)
SRI sum Time 3	10.00 (5.06) <sup>a</sup>	7.47 (4.00) <sup>b</sup>	8.69 (4.69)*
TAP-Chat aggressivity	0.084 (0.21) <sup>a</sup>	0.119 (0.20) <sup>a</sup>	0.102 (0.21)
TAP-Chat maximum aggressivity	1.02 (1.52) <sup>a</sup>	1.38 (1.72) <sup>a</sup>	1.20 (1.63)
TAP-Chat proportion of swearing	0.01 (0.4) <sup>a</sup>	0.02 (0.04) <sup>a</sup>	0.02 (.04)
SGMCTS2 physical assault sum	2.94 (9.04) <sup>a</sup>	2.07 (7.23) <sup>a</sup>	2.50 (8.14)
SGMCTS2 physical assault sum <sup>^</sup>	0.47 (1.03) <sup>a</sup>	0.41 (0.88) <sup>a</sup>	0.44 (0.95)
SGMCTS2 psychological aggression sum	8.57 (16.70) <sup>a</sup>	9.36 (16.55) <sup>a</sup>	8.97 (16.55)
SGMCTS2 psychological aggression sum <sup>^</sup>	1.46 (1.22) <sup>a</sup>	1.58 (1.20) <sup>a</sup>	1.52 (1.21)
DHEQ sum	118.20 (47.63) <sup>a</sup>	113.20 (44.75) <sup>a</sup>	115.60 (46.01)
IHS-R sum	8.19 (4.81) <sup>a</sup>	8.21 (4.75) <sup>a</sup>	8.20 (4.76)
BAQ verbal aggression sum	12.02 (4.05) <sup>a</sup>	11.80 (3.91) <sup>a</sup>	11.91 (3.96)

*Note:* Means in same row with different superscripts differ via an independent samples T-test,  $p < .01$ . \* = differs from mean score directly above via a paired samples T-test,  $p < .01$ . <sup>^</sup> = natural log transformed. PANAS neg. affect range (10-50), SRI range (0-16), TAP-Chat aggressivity range (0-5), TAP-Chat maximum aggressivity range (0-5), TAP-Chat proportion of swearing range (0-1), SGM-CTS2 physical assault range (0-240), SGM-CTS2 psych. aggression range (0-160), SGM-CTS2 physical assault range<sup>^</sup> (0-17.82), SGM-CTS2 psych. aggression range<sup>^</sup> (0-7.74), DHEQ range (0-250), IHS-R range (5-25), BAQ verbal range (5-25).

**Appendix C: Table 3.***Table 3. Bivariate intercorrelations of study measures of aggression and SMS (N = 110).*

Measure	1	2	3	4	5	6	7	8
1. TAP-Chat aggressivity	---							
2. TAP-Chat max aggressivity	.772**	---						
3. TAP-Chat swear proportion	.814**	.665**	---					
4. Physical IPV perpetration <sup>^</sup>	-.119	-.059	-.043	---				
5. Psychological IPV perpetration <sup>^</sup>	-.004	-.015	.031	.482**	---			
6. Dispositional aggression	.305**	.142	.273**	.307**	.395**	---		
7. Internal sexual minority stress	-.186	-.166	-.105	.228*	.113	.060	---	
8. External sexual minority stress	.055	-.118	.086	.325**	.187	.421**	.138	---
<i>M</i>	.102	1.20	.018	.439	1.52	61.46	8.20	115.60
<i>SD</i>	.205	1.63	.040	.949	1.21	19.37	4.76	46.01

\* =  $p \leq .01$ . <sup>^</sup> = natural log transformed

**Appendix E: Demographic Form**

## Demographics Form

Age: \_\_\_\_\_

Years of Education including kindergarten: \_\_\_\_\_ (example: completed traditional high school and no more = 13 years).

Are you currently enrolled at a 2- or 4-year college or university?

 Yes No

How do you describe your ethnicity?

 Hispanic or Latinx Non-Hispanic or Non-Latinx

How do you describe your race (check all that apply)?

 American Indian or Alaska Native Asian (including Southeast Asia and India) Native Hawaiian or Other Pacific Islander Black or African American Arab or North African White or Caucasian Other \_\_\_\_\_

Please indicate your sex assigned at birth:

 Male Female Other \_\_\_\_\_

How do you describe yourself?

 Male Female Non-binary Transgender Other \_\_\_\_\_

Do you consider yourself to be:

 Heterosexual or straight Gay Lesbian Questioning Bisexual Queer

Other \_\_\_\_\_

How would you characterize your current relationship status? (select all that currently apply):

single

dating casually

seriously dating/serious relationship(s)

engaged

married/domestic partnership

other \_\_\_\_\_

What is the length of your current relationship? (asked only if response on proceeding question was answered as "dating casually, seriously dating, engaged, or married.")

years

months

Were you in an intimate relationship in the past year? (for example: partnership, dating someone)

yes

no

Thinking about your intimate relationships in the past year, did at least one of them last at least one month?

yes

no

For your intimate relationships lasting longer than a month, did you see at least one of your partners in person 2 or more days per week on average?

yes

no

How many people have you been in a relationship with or dated in the past year?

\_\_\_\_\_

## Appendix F: The Positive and Negative Affect Schedule – Momentary

### The PANAS – (Momentary Assessment)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way *right now, at the present moment*.

Please use the following scale to record your answers:

1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	extremely

<input type="checkbox"/> interested	<input type="checkbox"/> irritable
<input type="checkbox"/> distressed	<input type="checkbox"/> alert
<input type="checkbox"/> excited	<input type="checkbox"/> ashamed
<input type="checkbox"/> upset	<input type="checkbox"/> inspired
<input type="checkbox"/> strong	<input type="checkbox"/> nervous
<input type="checkbox"/> guilty	<input type="checkbox"/> determined
<input type="checkbox"/> scared	<input type="checkbox"/> attentive
<input type="checkbox"/> hostile	<input type="checkbox"/> jittery
<input type="checkbox"/> enthusiastic	<input type="checkbox"/> active
<input type="checkbox"/> proud	<input type="checkbox"/> afraid

**Appendix G: State Rumination Instrument****SRI**

Instructions: Please read the following questions carefully and respond with the following choices:

0 = Not at All    1 = A little    2 = Moderately    3 = Quite a Bit    4 = Very Much

1. Are you finding it difficult to stop thinking about the images you just viewed?    0   1   2   3   4
2. Do your thoughts tend to dwell on negative aspects of the images or how you are feeling?    0   1   2   3   4
3. Does thinking about the images make them seem worse?    0   1   2   3   4
4. Are you thinking about past experiences with these type of events or are you thinking about if they might happen to you (whichever applies more to you)?    0   1   2   3   4

## Appendix H: Daily Heterosexist Experiences Questionnaire

### DHEQ

**Instructions: The following is a list of experiences that LGBT people sometimes have. Please read each one carefully, and then respond to the following question:**

*How much has this problem distressed or bothered you during the past 12 months?*

Response categories

- 0 = did not happen/not applicable to me,
- 1 = it happened, and it bothered me NOT AT ALL,
- 2 = it happened, and it bothered me A LITTLE BIT,
- 3 = it happened, and it bothered me MODERATELY,
- 4 = it happened, and it bothered me QUITE A BIT,
- 5 = it happened, and it bothered me EXTREMELY.

1. \_\_\_\_ Difficulty finding a partner because you are LGBT
2. \_\_\_\_ Difficulty finding LGBT friends
3. \_\_\_\_ Having very few people you can talk about being LGBT
4. \_\_\_\_ Watching what you say and do around heterosexual people
5. \_\_\_\_ Hearing about LGBT people you know being treated unfairly
6. \_\_\_\_ Hearing about LGBT people you don't know being treated unfairly
7. \_\_\_\_ Hearing about hate crimes (e.g., vandalism, physical or sexual assault) that happened to LGBT people you don't know.
8. \_\_\_\_ Being called names such as "fag" or "dyke"
9. \_\_\_\_ Hearing other people being called names such as "fag" or "dyke"
10. \_\_\_\_ Hearing someone make jokes about LGBT people
11. \_\_\_\_ Family members not accepting your partner as a part of your family
12. \_\_\_\_ Your family avoiding talking about your LGBT identity
13. \_\_\_\_ Your children being rejected by other children because you are LGBT
14. \_\_\_\_ Your children being verbally harassed because you are LGBT
15. \_\_\_\_ Feeling like you don't fit in with other LGBT people.
16. \_\_\_\_ Pretending that you have an opposite-sex partner
17. \_\_\_\_ Pretending that you are heterosexual
18. \_\_\_\_ Hiding your relationship from other people.
19. \_\_\_\_ People staring at you when you are in public because you are LGBT
20. \_\_\_\_ Constantly having to think about "safe sex"
21. \_\_\_\_ Feeling invisible in the LGBT community because of your gender expression
22. \_\_\_\_ Being harassed in public because of your gender expression
23. \_\_\_\_ Being harassed in bathrooms because of your gender expression
24. \_\_\_\_ Being rejected by your mother for being LGBT
25. \_\_\_\_ Being rejected by your father for being LGBT
26. \_\_\_\_ Being rejected by a sibling or siblings because you are LGBT
27. \_\_\_\_ Being rejected by other relatives because you are LGBT
28. \_\_\_\_ Being verbally harassed by strangers because you are LGBT



29. \_\_\_\_\_ Being verbally harassed by people you know because you are LGBT
30. \_\_\_\_\_ Worrying about getting HIV/AIDS
31. \_\_\_\_\_ Being treated unfairly in stores or restaurants because you are LGBT
32. \_\_\_\_\_ People laughing at you or making jokes at your expense because you are LGBT
33. \_\_\_\_\_ Hearing politicians say negative things about LGBT people
34. \_\_\_\_\_ Avoiding talking about your current or past relationship when you are at work
35. \_\_\_\_\_ Hiding part of your life from other people.
36. \_\_\_\_\_ Feeling like you don't fit into the LGBT community because of your gender expression.
37. \_\_\_\_\_ Difficulty finding clothes that you are comfortable wearing because of your gender expression
38. \_\_\_\_\_ Being misunderstood by people because of your gender expression
39. \_\_\_\_\_ Being treated unfairly by teachers or administrators at your children's school because you are LGBT
40. \_\_\_\_\_ People assuming you are heterosexual because you have children
41. \_\_\_\_\_ Being treated unfairly by parents of other children because you are LGBT
42. \_\_\_\_\_ Difficulty finding other LGBT families for you or your children to socialize with
43. \_\_\_\_\_ Worrying about infecting others with HIV
44. \_\_\_\_\_ Other people assuming that you are HIV positive because you are LGBT
45. \_\_\_\_\_ Discussing HIV status with potential partners
46. \_\_\_\_\_ Being punched, hit, kicked, or beaten because you are LGBT
47. \_\_\_\_\_ Being assaulted with a weapon because you are LGBT
48. \_\_\_\_\_ Being raped or sexually assaulted because you are LGBT
49. \_\_\_\_\_ Having objects thrown at you because you are LGBT
50. \_\_\_\_\_ Being sexually harassed because you are LGBT

## Appendix I: Revised Internalized Homophobia Scale – Men’s Version

### IHP-R Scale Men’s Version

**Instructions:** For each of the following below, please circle a number that best indicates how the statement applies to you. Answer according to the following scale:

- 1 - disagree strongly
- 2 - disagree slightly
- 3 - do not agree or disagree
- 4 - agree slightly
- 5 - agree strongly

- |  |   |   |   |   |   |
|--|---|---|---|---|---|
| 1. I have tried to stop being attracted to men.  | 1 | 2 | 3 | 4 | 5 |
| 2. If someone offered me the chance to be completely heterosexual, I would accept the chance.                    | 1 | 2 | 3 | 4 | 5 |
| 3. I wish I weren’t gay/bisexual.  | 1 | 2 | 3 | 4 | 5 |
| 4. I feel that being gay/bisexual is a personal shortcoming for me.  | 1 | 2 | 3 | 4 | 5 |
| 5. I would like to get professional help in order to change my sexual orientation from gay/bisexual to straight. | 1 | 2 | 3 | 4 | 5 |

## Appendix J: Revised Internalized Homophobia Scale – Women’s Version

### IHS-R Women’s Version

**Instructions:** For each of the following below, please circle a number that best indicates how the statement applies to you. Answer according to the following scale:

- 1 - disagree strongly
- 2 - disagree slightly
- 3 - do not agree or disagree
- 4 - agree slightly
- 5 - agree strongly

- |  |   |   |   |   |   |
|--|---|---|---|---|---|
| 1. I have tried to stop being attracted to women.  | 1 | 2 | 3 | 4 | 5 |
| 2. If someone offered me the chance to be completely heterosexual, I would accept the chance.                        | 1 | 2 | 3 | 4 | 5 |
| 3. I wish I weren’t lesbian/bisexual.  | 1 | 2 | 3 | 4 | 5 |
| 4. I feel that being lesbian/bisexual is a personal shortcoming for me.  | 1 | 2 | 3 | 4 | 5 |
| 5. I would like to get professional help in order to change my sexual orientation from lesbian/bisexual to straight. | 1 | 2 | 3 | 4 | 5 |

## Appendix K: Internalized Homophobia Scale – Men’s Version

### IHS-R Men’s Version

**Instructions:** For each of the following below, please circle a number that best indicates how the statement applies to you. Answer according to the following scale:

- 1 - disagree strongly
- 2 - disagree slightly
- 3 - do not agree or disagree
- 4 - agree slightly
- 5 - agree strongly

- |  |   |   |   |   |   |
|--|---|---|---|---|---|
| 1. I have tried to stop being attracted to men.  | 1 | 2 | 3 | 4 | 5 |
| 2. If someone offered me the chance to be completely heterosexual, I would accept the chance.                    | 1 | 2 | 3 | 4 | 5 |
| 3. I wish I weren’t gay/bisexual.  | 1 | 2 | 3 | 4 | 5 |
| 4. I feel that being gay/bisexual is a personal shortcoming for me.  | 1 | 2 | 3 | 4 | 5 |
| 5. I would like to get professional help in order to change my sexual orientation from gay/bisexual to straight. | 1 | 2 | 3 | 4 | 5 |

## Appendix L: Buss-Perry Aggression Questionnaire

### BAQ

**Instructions:** For each of the following below, please circle a number that best indicates how the statement applies to you.

Answer according to the following scale:

- 1 - Extremely uncharacteristic of me
- 2 -
- 3 - Moderately characteristic of me
- 4 -
- 5- Extremely characteristic of me

- |     |  |   |   |   |   |   |
|-----|--|---|---|---|---|---|
| 1.  | Once in a while I can't control the urge to strike another person. | 1 | 2 | 3 | 4 | 5 |
| 2.  | I tell my friends openly when I disagree with them.                | 1 | 2 | 3 | 4 | 5 |
| 3.  | I flare up quickly but get over it quickly.                        | 1 | 2 | 3 | 4 | 5 |
| 4.  | I am sometimes eaten up with jealousy.                             | 1 | 2 | 3 | 4 | 5 |
| 5.  | Given enough provocation, I may hit another person.                | 1 | 2 | 3 | 4 | 5 |
| 6.  | I often find myself disagreeing with people.                       | 1 | 2 | 3 | 4 | 5 |
| 7.  | When frustrated, I let my irritation show.                         | 1 | 2 | 3 | 4 | 5 |
| 8.  | At times I feel I have gotten a raw deal out of life.              | 1 | 2 | 3 | 4 | 5 |
| 9.  | If someone hits me, I hit back.                                    | 1 | 2 | 3 | 4 | 5 |
| 10. | When people annoy me, I may tell them what I think of them.        | 1 | 2 | 3 | 4 | 5 |
| 11. | I sometimes feel like a powder keg ready to explode.               | 1 | 2 | 3 | 4 | 5 |
| 12. | Other people always seem to get the breaks.                        | 1 | 2 | 3 | 4 | 5 |
| 13. | I get into fights a little more than the average person.           | 1 | 2 | 3 | 4 | 5 |
| 14. | I can't help getting into arguments when people disagree with me.  | 1 | 2 | 3 | 4 | 5 |
| 15. | I am an even-tempered person.                                      | 1 | 2 | 3 | 4 | 5 |
| 16. | I wonder why sometimes I feel so bitter about things.              | 1 | 2 | 3 | 4 | 5 |
| 17. | If I have to resort to violence to protect my rights, I will.      | 1 | 2 | 3 | 4 | 5 |
| 18. | My friends say that I'm somewhat argumentative.                    | 1 | 2 | 3 | 4 | 5 |
| 19. | Some of my friends think I'm a hothead.                            | 1 | 2 | 3 | 4 | 5 |
| 20. | I know that "friends" talk about me behind my back.                | 1 | 2 | 3 | 4 | 5 |
| 21. | There are people who pushed me so far that we came to blows.       | 1 | 2 | 3 | 4 | 5 |
| 22. | Sometimes I fly off the handle for no good reason.                 | 1 | 2 | 3 | 4 | 5 |
| 23. | I am suspicious of overly friendly strangers.                      | 1 | 2 | 3 | 4 | 5 |
| 24. | I can think of no good reason for ever hitting a person.           | 1 | 2 | 3 | 4 | 5 |
| 25. | I have trouble controlling my temper.                              | 1 | 2 | 3 | 4 | 5 |
| 26. | I sometimes feel that people are laughing at me behind my back.    | 1 | 2 | 3 | 4 | 5 |
| 27. | I have threatened people I know.                                   | 1 | 2 | 3 | 4 | 5 |
| 28. | When people are especially nice, I wonder what they want.          | 1 | 2 | 3 | 4 | 5 |
| 29. | I have become so mad that I have broken things.                    | 1 | 2 | 3 | 4 | 5 |

## Appendix M: Sexual and Gender Minority – Conflict Tactics Scale – 2

### SGM-CTS-2

No matter how well a couple gets along, there are times when they disagree, get annoyed with the other person, want different things from each other, or just have spats or fights because they are in a bad mood, are tired, or for some other reason. Couples also have many different ways of trying to settle their differences. This is a list of things that might happen when you have differences. Please circle how many times you did each of these things in the past year, and how many times your partner did them in the past year.

How many times **in the past year**:

*0 = Never in the past year 1 = Once in the past year 2 = Twice in the past year  
3 = 3-5 times in the past year 4 = 6-10 times in the past year 5 = 11-20 times in the past year  
6 = More than 20 times in the past year*

1.	I showed my partner I cared even though we disagreed.	0	1	2	3	4	5	6
2.	My partner showed care for me even though we disagreed.	0	1	2	3	4	5	6
3.	I explained my side of a disagreement to my partner.	0	1	2	3	4	5	6
4.	My partner explained their side of a disagreement to me.	0	1	2	3	4	5	6
5.	I swore at my partner.	0	1	2	3	4	5	6
6.	My partner swore at me.	0	1	2	3	4	5	6
7.	I threw something at my partner that could hurt.	0	1	2	3	4	5	6
8.	My partner threw something at me that could hurt.	0	1	2	3	4	5	6
9.	I twisted my partner's arm or hair.	0	1	2	3	4	5	6
10.	My partner twisted my arm or hair.	0	1	2	3	4	5	6
11.	I had a sprain, bruise, or small cut because of a fight with my partner.	0	1	2	3	4	5	6
12.	My partner had a sprain, bruise, or small cut because of a fight with me.	0	1	2	3	4	5	6
13.	I showed respect for my partner's feelings about an issue.	0	1	2	3	4	5	6
14.	My partner showed respect for my feelings about an issue.	0	1	2	3	4	5	6
15.	I refused to use the safe sex methods that my partner requested to use (e.g., a condom, dental dam, etc.).	0	1	2	3	4	5	6
16.	My partner refused to use the safe sex methods that I requested to use.	0	1	2	3	4	5	6
17.	I pushed or shoved my partner.	0	1	2	3	4	5	6
18.	My partner pushed or shoved me.	0	1	2	3	4	5	6
19.	I used a knife or gun on my partner.	0	1	2	3	4	5	6
20.	My partner used a knife or gun on me.	0	1	2	3	4	5	6
21.	I passed out from being hit on the head by my partner in a fight.	0	1	2	3	4	5	6
22.	My partner passed out from being hit on the head in a fight with me.	0	1	2	3	4	5	6
23.	I called my partner names, insulted them, or treated my partner disrespectfully in front of others	0	1	2	3	4	5	6
24.	My partner called me names, insulted them, or treated me disrespectfully in front of others.	0	1	2	3	4	5	6
25.	I punched or hit my partner with something that could hurt	0	1	2	3	4	5	6
26.	My partner punched or hit me with something that could hurt.	0	1	2	3	4	5	6
27.	I destroyed something belonging to my partner.	0	1	2	3	4	5	6
28.	My partner destroyed something belonging to me.	0	1	2	3	4	5	6

29.	I went to a doctor because of a fight with my partner.	0	1	2	3	4	5	6
30.	my partner went to a doctor because of a fight with me.	0	1	2	3	4	5	6
31.	I choked my partner.	0	1	2	3	4	5	6
32.	my partner choked me.	0	1	2	3	4	5	6
33.	I shouted or yelled at my partner.	0	1	2	3	4	5	6
34.	my partner shouted or yelled at me.	0	1	2	3	4	5	6
35.	I slammed my partner against a wall.	0	1	2	3	4	5	6
36.	My partner slammed me against a wall.	0	1	2	3	4	5	6
37.	I said I was sure we could work out a problem.	0	1	2	3	4	5	6
38.	My partner was sure we could work out a problem.	0	1	2	3	4	5	6
39.	I needed to see a doctor because of a fight with my partner, but I didn't.	0	1	2	3	4	5	6
40.	My partner needed to see a doctor because of a fight with me, but they didn't.	0	1	2	3	4	5	6
41.	I beat up my partner.	0	1	2	3	4	5	6
42.	My partner beat me up.	0	1	2	3	4	5	6
43.	I grabbed my partner.	0	1	2	3	4	5	6
44.	My partner grabbed me.	0	1	2	3	4	5	6
45.	I used force (such as hitting, holding down, or using a weapon) to make my partner have sex.	0	1	2	3	4	5	6
46.	My partner used force (such as hitting, holding down, or using a weapon) to make me have sex.	0	1	2	3	4	5	6
47.	I stomped out of the room or house or yard during a disagreement.	0	1	2	3	4	5	6
48.	My partner stomped out of the room or house or yard during a disagreement.	0	1	2	3	4	5	6
49.	I insisted on having sex when my partner did not want to (but did not use physical force).	0	1	2	3	4	5	6
50.	My partner insisted on having sex when I did not want to (but did not use physical force).	0	1	2	3	4	5	6
51.	I slapped my partner.	0	1	2	3	4	5	6
52.	My partner slapped me.	0	1	2	3	4	5	6
53.	I had a broken bone from a fight with my partner.	0	1	2	3	4	5	6
54.	My partner had a broken bone from a fight with me	0	1	2	3	4	5	6
55.	I suggested a compromise to a disagreement.	0	1	2	3	4	5	6
56.	My partner suggested a compromise to a disagreement.	0	1	2	3	4	5	6
57.	I burned or scalded my partner on purpose.	0	1	2	3	4	5	6
58.	My partner burned or scalded me on purpose.	0	1	2	3	4	5	6
59.	I accused my partner of being a lousy partner.	0	1	2	3	4	5	6
60.	My partner accused me of being a lousy partner.	0	1	2	3	4	5	6
61.	I did something to spite my partner.	0	1	2	3	4	5	6
62.	My partner did something to spite me.	0	1	2	3	4	5	6
63.	I threatened to hit or throw something at my partner	0	1	2	3	4	5	6
64.	My partner threatened to hit or throw something at me	0	1	2	3	4	5	6
65.	I felt physical pain the next day because of a fight we had.	0	1	2	3	4	5	6
66.	My partner felt physical pain the next day because of a fight we had.	0	1	2	3	4	5	6
67.	I kicked my partner.	0	1	2	3	4	5	6
68.	My partner kicked me.	0	1	2	3	4	5	6
69.	I used threats to make my partner have sex.	0	1	2	3	4	5	6

70.	My partner used threats to make me have sex.	0	1	2	3	4	5	6
71.	I agreed to try a solution my partner suggested.	0	1	2	3	4	5	6
72.	My partner agreed to try a solution I suggested.	0	1	2	3	4	5	6
73.	My partner had sex with me when I was unable to consent because I was so high, drunk, or passed out.	0	1	2	3	4	5	6
74.	I had sex with my partner when they were unable to consent because they were so high, drunk, or passed out.	0	1	2	3	4	5	6



## Appendix N: Post Debriefing Survey

### PDS

1. Upon completing the debriefing and online study today, do you feel you are more, less, or just as likely/unlikely to behave aggressively?

Please rate how distressing you found the following study procedures using this scale:

Not distressing at all    Somewhat distressing    Moderately distressing    Extremely distressing

2. Having to view images depicting violence/harm to people:

3. Having to view images depicting homophobia and violence/harm to sexual minority people (if applicable):

4. Receiving “mean” or insulting messages from your opponent:

5. Being informed you were not were not actually sending messages to a real person and were not receiving messages from a real person:

6. Being informed that “deception” was used in the study (e.g., there was no opponent):

## Appendix O: Cognitive Interview

### Cognitive Interview (CI)

#### MANIPULATION CHECK:

*“Did you think this was a good measure of reaction-time?”*

*“How did you/your opponent perform?”*

*“Were they reasonable/what were they like?”*

*“Did you do your best on the task?”*

#### STRESS INDUCTION CHECK:

*“What did you think of the images you viewed at the time you were viewing them?”*

*“Did viewing those images affect you in any way at the time? How so?”*

*“What were you feeling as you viewed the pictures?”*

#### TAP-Chat AFFECTS AND COGNITIONS:

*“What were you thinking/feeling as you started the reaction time task?”*

*“Were you still thinking of the images you viewed earlier during the start of the task?”*

*“Do you think these images affected your performance, if so, how?”*

*“What were you thinking/feeling when you were in about the middle of the reaction time task?”*

*“Were you still thinking of the images you viewed earlier?”*

*“Do you think these images affected your performance, if so, how?”*

*“What were you thinking/feeling as you completed the reaction time task?”*

*“Were you still thinking of the images you viewed earlier?”*

*“Do you think these images affected your performance, if so, how?”*

*“What are you thinking/feeling as of this moment?”*

*“Are you still thinking of the images you viewed earlier?”*

## Appendix P: Brief Study Procedure

### Brief Study Procedure

1. Tentatively eligible research participants are sent the study weblink to open.
2. Informed consent is collected. (5 mins)
3. Demographic survey/eligibility screener is administered. (7 mins)
  - a. Ineligible participants are dismissed. Eligible participants are randomized to study condition and advance to new study page.
4. PANAS is administered (**TIME 1**). (3 minutes)
5. Instructions to study procedures are provided. (15 mins)
6. Stress Induction is administered. (5 minutes)
7. PANAS and SRI are administered (**TIME 2**). (4 mins)
8. TAP-Chat is administered. (12 mins)
9. PANAS and SRI are administered (**TIME 3**). (4 mins)
10. Cognitive Interview is conducted. (15 minutes)
  - a. Aggression manipulation check.
  - b. Stress induction check.
  - c. TAP-Chat thoughts and feelings are assessed.
11. Internal and external sexual minority stress, dispositional aggression, and SGM-CTS2 measures are administered. (25 minutes)
12. Participants begin debriefing.
  - a. Debriefing video is shown which follows along the displayed-on-screen debriefing form. (10 minutes)
  - b. Positive Mood Induction is administered. (9 minutes).

- c. Participants complete Post-Debriefing Survey (3 minutes).
    - i. If necessary or requested, mental health and crisis resources are shared.
13. Online study module closes.

Total elapsed time: 117 minutes or ~2 hours