

Rape Aggression Defense Course: Physical, Psychological, and Interpersonal Benefits Among Women With and Without Interpersonal Victimization Histories

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Abstract

Women's self-defense training increases self-efficacy and reduces subsequent assaults, but self-defense training's effects on women's psychological and interpersonal functioning are understudied, particularly for women with histories of interpersonal victimization. This study examined the effects of a self-defense course on somatic symptoms, post-traumatic stress symptoms, depression, anxiety, interpersonal problems, and locus of control among women with and without interpersonal victimization histories and explored how women's disinhibition of their aggression during simulated attacks predicts changes in their symptoms and functioning. In all, 82 women reported their symptoms and functioning before participation and 6 weeks after participation in a university-based Rape Aggression Defense course.

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Among the whole sample, participation in the course led to significantly decreased posttraumatic stress, somatic, and hostility symptoms and problems with being too nonassertive, overly accommodating, and self-sacrificing. Women who reported interpersonal victimization histories ($n = 49$) did not differ in the degree of improvements when compared with women without interpersonal victimization histories ($n = 33$). Greater disinhibition during the simulation predicted less improvement in some symptoms; moderation analyses showed that this association occurred only among those women with high baseline anxiety or hostility. These findings highlight the value of self-defense training in improving the health of women, including posttraumatic stress symptoms and interpersonal functioning, regardless of women's history of interpersonal victimization. Results also suggest the importance of considering women's baseline symptoms in modulating the degree of aggression that is optimally expressed during training.

Keywords

violence exposure, sexual assault, mental health and violence, PTSD, domestic violence

Introduction

Women's self-defense training seeks to prepare them to resist potential assaults by teaching practical verbal and physical self-defense techniques (Cummings, 1992). Such training has been shown to prepare women to use more protective behaviors (Gidycz, Rich, Orchowski, King, & Miller, 2006) and avoid rape (Bart & O'Brien, 1985; Brecklin & Ullman, 2005; Hollander, 2014; Orchowski, Gidycz, & Raffle, 2008; Senn et al., 2015; Senn et al., 2017). In addition, self-defense training allows women to "rehearse a new script for bodily comportment" (McCaughey, 1998) by using their voices and bodies in aggressive and powerful ways that contradict deeply entrenched gender norms. Women often report this experience as transformative (Hollander, 2004), and a few studies have examined the effects of self-defense training on women's lives. Both self-esteem (Smith, 1983) and self-efficacy (Hollander, 2004; Ozer & Bandura, 1990; Shim, 1998; Weitlauf, Smith, & Cervone, 2000) increase following self-defense training, and training may also improve physical and psychological functioning, such as anxiety and depression (Ozer & Bandura, 1990; Shim, 1998), although very few studies have examined such outcomes.

Self-defense training has the potential to reduce post-traumatic stress disorder symptoms (David, Simpson, & Cotton, 2006; Rosenblum & Taska, 2014) because participants are encouraged to confront a feared stimulus (i.e., an assault) without further sensitization. The bodily activation of power and aggression also mirrors role-play or rescripting techniques sometimes used in PTSD treatment and may redress the conditioned freeze response that some trauma survivors experience (Rosenblum & Taska, 2014). Some evidence suggests the effectiveness of self-defense training for PTSD symptoms among women with trauma histories. In a small pilot study of 12 women veterans with PTSD, participants reported significant reductions in PTSD hyperarousal and depression after training (David et al., 2006). Further examination of the effects of self-defense training on PTSD and other psychiatric symptoms among a larger sample of women with trauma histories is needed.

Self-defense training also may result in more adaptive interpersonal functioning by overcoming psychological barriers to assertion, such as the socialization of women to “be nice” and put others’ needs before their own, as well as fear of hurting, angering, or offending others (Norris, Nurius, & Dimeff, 1996). Research has shown these psychological barriers to be inversely related to forceful resistance to sexual assault (Norris, Zawacki, Davis, & George, 2018). Furthermore, there is some evidence that women with victimization histories are less likely than women without such histories to resist assault assertively and forcefully, possibly because of having more psychological barriers to forceful resistance (Norris et al., 2018). Thus, these barriers are an important target for change through self-defense training. Notably, there is preliminary evidence indicating that self-defense training can increase assertive interpersonal behaviors, which suggests the aforementioned psychological barriers may decrease as a result of self-defense training. In a survey of women students who participated in a university-based self-defense course, Hollander (2004) found that most students reported that their interactions with both strangers and nonstrangers had changed; they were able to be more assertive, make strong eye contact, say “no,” and yell or hit if necessary. These reports were qualitative, however; women’s interpersonal style was not assessed quantitatively at either baseline or follow-up. With the exception of increased assertiveness following self-defense training (Frost, 1991; Lidsker, 1991; Weitlauf et al., 2000), studies have not examined how training impacts interpersonal functioning.

Some self-defense courses, such as Rape Aggression Defense (RAD) Systems (Nadeau, n.d.) and Model Mugging (Frost, 1991), incorporate simulated assault exercises in which the student defends herself against an aggressor, who is in a padded protective suit. This simulation can be emotionally challenging or frightening for women, and its effects are relatively

unknown. One study (Michener, 1996) compared the effectiveness of RAD with and without simulated assaults using a pre-post design. This study found that participants in both groups perceived that the course was effective, felt better able to defend themselves after the course, and experienced an increase in confidence. No research, however, has examined the relationship between self-defense training simulations, degree of aggression expression, and subsequent anger/hostility and other symptoms. On one hand, studies suggest that anger expression may increase subsequent anger and aggression (e.g., Bushman, 2002; Lohr, Olatunji, Baumeister, & Bushman, 2007). On the other hand, the simulation has similarities to psychotherapies that encourage the healthy expression of anger toward perpetrators of past traumatic events, suggesting that powerful aggression during the simulated assault may yield therapeutic benefits, particularly because women have historically been socially constrained from exhibiting these attitudes and behaviors. Women vary with respect to the degree to which they disinhibit or express aggression during the simulation, that is, how much they really “let loose” on the attacker. Women who are more disinhibited during the simulation may have a more powerful corrective emotional experience that augments the psychological benefits they receive from the course. It also is possible, however, that the strong expression of anger or aggression could sensitize or overwhelm women and lead to poorer outcomes, especially if women are not psychologically ready for such expression or they experience too much social demand or pressure to express. Women’s responses to the attack simulation may depend on background factors, such as their baseline psychological fear or emotional dysregulation.

A relatively high proportion of women who seek self-defense training have been victimized in the past (Brecklin, 2004). It is not known whether women with interpersonal victimization histories benefit or not, and as noted by Gidycz and Dardis (2014), more research is needed to understand how a history of victimization and other characteristics of the participants predict program effectiveness. Perhaps women with victimization histories uniquely benefit because the class helps them overcome helplessness and fear of their own power and aggression. Alternatively, such women may not benefit or even worsen if they are sensitized or retraumatized by the class. Rosenblum and Taska (2014) noted that consideration of the “window of tolerance”—the range of emotional arousal an individual can experience without a disruption in functioning (Siegel, 1999)—is crucial to ensure benefit. In addition, it is possible that women with a history of interpersonal victimization may perceive an underlying message from the class that they could have stopped their past assault if they had more skills, that is, perceived “victim blaming” could

increase self-blame and depression. Gidycz and Dardis (2014) note that this is a common criticism of traditional self-defense classes, but these authors argue that self-defense programs do not increase victim blaming, particularly if the class takes a feminist approach by assuming women are capable of defending themselves, focusing on techniques that use areas of strength in women's bodies and empowering women to overcome psychological barriers to self-defense. The RAD course evaluated in the current study takes this approach, although it is not explicitly feminist in its didactics, nor does it directly address victim blaming.

Goals and Hypotheses of the Current Study

This study sought to address several limitations in the existing literature on self-defense training. Previous studies have been limited by short-term follow-ups, such as posttraining assessments only. Most studies are greatly limited in ethnic diversity (Brecklin, 2004), which is problematic given that the intersection of race and gender impacts how women experience self-defense courses such as RAD (Speidel, 2014). Most studies have also focused solely on young women (college students). The current study redressed those limitations by including a more ethnically and age-diverse sample and reassessing participants 6 weeks after training. Important health outcomes including physical symptoms and depression are understudied, and little is known about the impact of self-defense training on women with interpersonal victimization histories. Understanding responses to the assault simulation is also important, given that this is the most intense and sometimes feared part of the training.

This study examined the effects of a university-based RAD course among women with and without interpersonal victimization histories on a variety of important but understudied domains: psychological and physical health symptoms (i.e., posttraumatic stress, depression, anxiety, hostility, and somatic symptoms), interpersonal problems, and internal locus of control. We hypothesized that women overall would report significantly reduced posttraumatic stress, depression, anxiety, hostility, somatic symptoms and interpersonal problems, and increased internal locus of control 6 weeks after the course, compared with baseline. Moreover, we tested whether women with interpersonal victimization histories would experience greater or lesser improvements in these problems than women without such histories. We also assessed the degree of women's disinhibition of their aggression during simulated attacks and explored how the level of disinhibition predicted changes in women's symptoms and functioning after the course, and how women's baseline symptoms moderated this relationship.

Method

Participants

Participants were adult women (at least 18 years old) enrolled in the RAD basic course conducted by the police department of a large, urban university in the midwest United States. RAD courses were offered every 1 to 2 months, and emails announcing each course were sent from the police department to all university faculty, staff, and students. Women family members and women from the community also were invited to participate in the RAD courses.

Procedure

This study was approved by the local institutional review board (IRB) before recruitment. Study activities were conducted at a university police department in collaboration with officers at the department who coordinated and instructed the RAD program. Participants were recruited from RAD courses offered by this police department over a period of 18 months. At the start of each four-session course, the researchers described the study to the women enrolled in the course, and those women who were willing to participate provided their names and contact information. The researchers immediately sent a personalized email to each interested woman, which included a link directing her to a website containing the baseline questionnaires. Participants completed baseline questionnaires after Session 1, which was an orientation/education session, but before physical self-defense training started in Session 2. The survey contained an information sheet that notified participants that completing the measures indicated their informed consent. Six weeks after the last session (Session 4) of each course, each woman again received an email asking her to complete the follow-up outcome measures on the website.

RAD Course

The RAD course consisted of four, 3-hour sessions over the course of either four consecutive days or twice per week over 2 weeks. The first session included an orientation to the course and a lecture; the second and third sessions included instruction and practice of self-defense techniques. During these sessions, students practiced using verbal assertion (e.g., shouting "No!") and physical aggression (e.g., kicking, punching) against an imagined attacker. In Session 4, an aggression exercise was conducted, wherein each participant practiced the self-defense techniques they learned against a

simulated aggressor—a man (wearing a padded protective suit) who approached and grabbed the woman from behind. In this simulation, participants were strongly encouraged to fully engage their minds and bodies to fight off the attacker by yelling, kicking, and hitting, as if the attack were real. Each participant's simulation exercise was watched together as a group, and the RAD instructors and participants provided feedback during a group discussion.

Measures

Predictors of response to RAD course

Interpersonal victimization. For this study, we modified the Life Events Checklist for *DSM-5* (LEC-5; Weathers et al., 2013) by including a broader range of interpersonal assaults relevant to our study (i.e., childhood sexual abuse, childhood physical or psychological abuse, intimate partner violence, and adult sexual assault). To obtain a measure of interpersonal victimization, only the seven interpersonal events were scored, excluding the noninterpersonal traumas such as fire or explosion, transportation accident, or serious accident at work, home, or during recreational activity. Participants indicated at baseline which traumatic events they had experienced in their lifetimes.

Inhibition or disinhibition of aggression. Participants responded to a self-report question at follow-up that we developed to assess the degree to which their expression of aggression during the simulation was inhibited or disinhibited: “To what extent did you really ‘let loose’ (e.g., kick or punch hard, yell loudly) on the aggressor during the simulation exercise?” The item was rated on a scale of 1 (*not at all*) to 5 (*extremely*).

Baseline/outcome measures

Posttraumatic stress symptoms. Posttraumatic stress symptoms were assessed using the Impact of Events Scale–Revised (IES-R), a widely used and reliable measure of posttraumatic stress symptoms (Weiss & Marmar, 1996). In addition to a total score, the IES-R consists of three subscales assessing posttraumatic stress symptoms of avoidance, intrusion, and hyperarousal. Participants were instructed to identify a particularly stressful experience that continues to bother them, and then rate their experience of each symptom over the past week with respect to that stressful experience on a scale of 1 (*not at all*) to 5 (*extremely*). Participants completed this questionnaire immediately after the modified LEC, so that they were primed to respond to those items. Ratings were averaged; higher scores indicate greater symptoms. In our sample, the three subscales were highly correlated with

one another at baseline (r s from .82 to .85) and follow-up (r s from .75 to .85). Thus, only the IES total score was analyzed. In our sample, the IES total score had excellent internal consistency reliability at baseline and follow-up ($\alpha = .95$ at both time points).

Somatic symptoms. The Patient Health Questionnaire–15 (PHQ-15) is a 15-item, widely used, reliable and valid measure of somatic symptoms (Kroenke, Spitzer, & Williams, 2002; Kroenke, Spitzer, Williams, & Lowe, 2010). Participants rated symptoms experienced over the last week on a scale of 0 (*not bothered*) to 2 (*bothered a lot*). Ratings were summed; higher scores indicate greater somatic symptoms. In our sample, this scale had acceptable internal consistency at baseline ($\alpha = .71$) and follow-up ($\alpha = .68$).

Depressive symptoms. Depressive symptoms were assessed using the Patient Health Questionnaire–8 (PHQ-8), an eight-item, reliable and valid measure of depressive symptoms that is widely used among patient (Ory et al., 2013; Razykov, Ziegelstein, Whooley, & Thombs, 2012) and nonpatient populations (Kroenke et al., 2009). Participants rated symptoms over the past 2 weeks on a scale of 0 (*not at all*) to 3 (*nearly every day*). Ratings were summed; higher scores indicate greater depressive symptoms. In our sample, this scale had good internal consistency at baseline ($\alpha = .81$) and follow-up ($\alpha = .80$).

Generalized anxiety symptoms. Anxiety symptoms were assessed using the Generalized Anxiety Disorder–7 (GAD-7), which is a reliable measure of generalized anxiety symptoms widely used among a variety of populations (Spitzer, Kroenke, Williams, & Lowe, 2006; Kroenke et al., 2010). Participants rated symptoms over the past 2 weeks on a scale of 0 (*not at all*) to 3 (*nearly every day*). Ratings were summed; higher scores indicate greater anxiety symptoms. In our sample, this measure had excellent internal consistency at baseline ($\alpha = .92$) and follow-up ($\alpha = .88$).

Hostility symptoms. Hostility symptoms were assessed using the five-item Hostility subscale of the Brief Symptom Inventory (BSI), a widely used and validated measure of a variety of psychiatric symptoms (Derogatis & Melisaratos, 1983). The Hostility subscale was used to determine whether anger expression and aggression increase or decrease women's symptoms of anger and hostility. Participants rated their symptoms over the past week on a scale of 0 (*not at all*) to 4 (*extremely*). Ratings were averaged; higher scores indicate greater hostility symptoms. This measure had good internal consistency in our sample at baseline ($\alpha = .81$) and follow-up ($\alpha = .73$).

Interpersonal problems. The Inventory of Interpersonal Problems (IIP-32) is a 32-item self-report measure of eight interpersonal difficulties commonly addressed in psychotherapy: being too aggressive (Domineering), being suspicious and distrustful (Vindictive), having trouble with affection (Cold), being socially anxious and shy (Socially Inhibited), difficulty being assertive (Nonassertive), being too trusting and permissive (Overly Accommodating), being too eager to please others (Self-Sacrificing), and seeking attention inappropriately (Intrusive; Barkham, Hardy, & Startup, 1996; Alden, Wiggins, & Pincus, 1990). Participants rated their agreement for each item from 0 (*not at all*) to 4 (*extremely*). Ratings were summed; higher scores indicate more difficulty on that domain. We analyzed only the four subscales that we hypothesized participation in the RAD course might impact: Socially Inhibited, Nonassertive, Overly Accommodating, and Self-Sacrificing. In our sample, each subscale had good internal consistency at both baseline ($\alpha = .79$ to $.88$) and follow-up ($\alpha = .77$ to $.92$).

Internal locus of control. Internal locus of control was assessed using the three-item Internal Control subscale from the Locus of Control–Brief scale (LOC-B; Sapp & Harrod, 1993). Participants rated their agreement with each item on a scale of 1 (*strongly disagree*) to 6 (*strongly agree*). Ratings were summed; higher scores indicate higher internal locus of control. This measure had acceptable internal consistency at baseline ($\alpha = .68$) and follow-up ($\alpha = .69$).

Statistical Analyses

We used SPSS v. 25 to screen data, compute descriptive statistics, and conduct most inferential tests. Our primary analyses examined responses to the RAD class from baseline to follow up for the whole sample, and then again for the two subsamples that had—or did not have—interpersonal victimization histories. Because we have a relatively large number ($n = 10$) of correlated outcome measures, we guarded against Type I errors by conducting repeated-measures multivariate analyses of variance (MANOVAs) on all 10 outcomes simultaneously. Only statistically significant MANOVAs were followed by univariate tests on each outcome (analyses of variance [ANOVAs]). Therefore, we first conducted a MANOVA to test the effect of time (baseline to follow up) on all outcomes for the full sample, and then two MANOVAs on the same outcomes among those with and without interpersonal victimization histories. Also, we conducted a 2-way MANOVA to determine whether there was an interaction between time and interpersonal victimization history on all outcomes—that is, whether the two subgroups showed different effects

of the class. Effect sizes (d) were calculated by subtracting baseline scores from follow-up scores and dividing by the baseline standard deviation.

In secondary analyses, we calculated correlations to examine how disinhibition of aggression during the simulation predicted changes in outcomes. Also, exploratory analyses tested whether women's baseline anxiety, hostility, and post-traumatic stress symptoms moderated the relationship between disinhibition during the simulated assault and changes in anxiety, hostility, and post-traumatic stress symptoms. These moderator analyses used PROCESS v. 3 (Hayes, 2018), and simple slopes analyses (Aiken, West, & Reno, 1991) probed significant moderation effects.

Results

In all, 96 women started the study and completed baseline questionnaires, and 82 of the women (85%) completed the study, providing 6-week follow-up data. Analyses were conducted on these 82 women, who ranged in age from 18 to 66 years ($M = 33.1$; $SD = 13.1$) and identified as White/European American (59%), Black/African American (20%), South Asian (10%), East Asian (9%), American Indian or Alaskan Native (1%), or Other (1%); 6% of the sample also identified as Hispanic or Latino ethnicity. About half of the participants were married (32%) or living with a partner in a committed relationship (15%), and the other half were either never married (39%) or separated or divorced (12%). As expected for a study of a university-based course, the sample was relatively well educated, with 31% reporting an undergraduate degree or at least 4 years of college, and another 38% reporting a master's or doctoral degree. Most participants were employed full-time (46%) or part-time (26%); however, only 35% were full-time students.

Effects of RAD for the Full Sample

Table 1 presents baseline and follow-up data for all outcomes for the full sample. The MANOVA on all outcomes revealed a significant multivariate effect of time for the full sample, $F(10, 72) = 2.43$, $p = .015$, so univariate tests were conducted. As shown in Table 1, these analyses revealed small magnitude ($d = -0.15$ to $-0.27 SD$), yet statistically significant reductions from baseline to 6-week follow-up on post-traumatic stress symptoms, somatic symptoms, hostility, and problems with being too nonassertive, overly accommodating, and self-sacrificing. There were no significant changes in depressive or anxiety symptoms, social inhibition, or internal locus of control.

Table 1. Effects of Rape Aggression Defense Course on Full Sample ($N = 82$) From Baseline to Follow-Up.

	Baseline M (SD)	Follow-up M (SD)	Effect size (d)	Analysis of Variance (F)
Post-traumatic stress	2.15 (2.30)	1.60 (1.81)	-0.24	5.26*
Somatic symptoms	5.20 (3.46)	4.36 (3.15)	-0.24	5.22*
Depression	11.06 (3.29)	10.65 (3.00)	-0.12	1.47
Generalized anxiety	10.67 (4.46)	10.11 (3.58)	-0.13	2.62
Hostility	1.39 (0.55)	1.26 (0.37)	-0.24	7.10**
Social inhibition	3.74 (3.62)	3.46 (3.27)	-0.08	0.85
Nonassertive	5.24 (4.08)	4.15 (4.04)	-0.27	8.41**
Overly accommodating	5.10 (3.71)	4.19 (3.40)	-0.25	7.38**
Self-sacrificing	4.95 (4.41)	4.31 (3.87)	-0.15	5.05*
Internal locus of control	14.38 (3.02)	14.22 (3.12)	-0.05	0.17

Note. A repeated-measures MANOVA on all outcomes had a significant time effect, $F(10, 72) = 2.43, p = .015$, so univariate tests of significance were conducted. Effect size was calculated as follow-up minus baseline value divided by baseline SD. MANOVA = multivariate analysis of variance.

* $p < .05$. ** $p < .01$.

Effects of RAD for Women With Interpersonal Victimization Histories

We distinguished those women who had experienced at least one interpersonal victimization event in their lives—that is, any physical or sexual assault, neglect by a parent, or verbal or emotional abuse by a parent or romantic partner ($n = 49, 60\%$)—from those women who reported experiencing no such interpersonal victimization ($n = 33, 40\%$). Among women who reported a history of interpersonal victimization, 47% reported sexual victimization, 40% reported emotional or physical abuse by a romantic partner, 21% reported physical assault by a nonpartner, 18% reported abuse or neglect by a parent, and 8% reported assault with a weapon.

Descriptive data for all outcomes for both the interpersonal victimization and no-interpersonal victimization subgroups of the sample are presented in Table 2. There was no significant multivariate effect of time on outcomes among women with, $F(10, 39) = 1.85, p = .08$, or without, $F(10, 23) = 1.67, p = .15$, interpersonal victimization history; therefore, post hoc univariate analyses were not conducted. Furthermore, there was no multivariate effect

Table 2. Effects of Rape Aggression Defense Course for Women with and without Interpersonal Victimization Histories from Baseline to Follow Up.

	Interpersonal Victimization (<i>n</i> = 49)			No Interpersonal Victimization (<i>n</i> = 33)		
	Baseline <i>M</i> (<i>SD</i>)	Follow-Up <i>M</i> (<i>SD</i>)	Effect size (<i>d</i>)	Baseline <i>M</i> (<i>SD</i>)	Follow-Up <i>M</i> (<i>SD</i>)	Effect size (<i>d</i>)
Post-traumatic stress	2.43 (2.38)	2.38 (1.97)	-0.19	1.11 (1.63)	0.72 (1.03)	-0.24
Somatic symptoms	5.76 (3.34)	4.91 (3.28)	-0.25	4.36 (3.51)	3.55 (2.80)	-0.23
Depression	11.12 (3.52)	11.35 (3.03)	0.07	10.97 (2.96)	9.61 (2.66)	-0.46
Generalized anxiety	10.78 (4.35)	10.61 (3.98)	-0.04	10.52 (4.68)	9.36 (2.78)	-0.25
Hostility	1.43 (0.55)	1.33 (0.43)	-0.19	1.32 (0.56)	1.16 (0.25)	-0.29
Social inhibition	3.92 (3.21)	3.55 (3.41)	-0.12	3.48 (3.50)	3.32 (3.41)	-0.05
Nonassertive	5.65 (4.20)	4.53 (3.88)	-0.27	4.64 (3.88)	3.57 (3.88)	-0.28
Overly accommodating	5.63 (3.89)	4.80 (3.10)	-0.21	4.30 (3.31)	3.28 (3.10)	-0.31
Self-sacrificing	5.51 (4.60)	5.00 (3.48)	-0.11	4.12 (4.02)	3.31 (3.48)	-0.20
Internal locus of control	14.35 (3.27)	14.51 (3.90)	0.05	14.42 (2.65)	13.79 (3.90)	-0.24

Note. The repeated-measure MANOVAs on all outcomes were not significant for either of the interpersonal victimization subgroups; therefore, univariate tests on each outcome were not conducted. MANOVA = multivariate analysis of variance

of the interaction between time and interpersonal victimization history on outcomes, $F(10, 71) = 0.80, p = .63$, indicating no significant different differences in effect sizes between the two victimization history subgroups. This finding is consistent with a visual inspection of effect sizes within each subgroup, which suggest that both victimization and no-victimization subgroups had comparable improvements on most outcomes at 6-week follow-up.

Predictors and Outcomes of Inhibition or Disinhibition of Aggression

Baseline posttraumatic stress and anxiety symptoms were tested as predictors of participants' self-rated aggression disinhibition (i.e., "letting loose," or kicking or punching hard and yelling loudly) toward the aggressor during the simulation exercise. Both baseline posttraumatic stress symptoms ($r = -.29, p = .01$) and anxiety symptoms ($r = -.32, p = .003$) were significantly negatively correlated with disinhibition during the simulation exercise; that is, women who had more posttraumatic stress symptoms or who were more anxious at baseline were more likely to inhibit their aggression during the simulation exercise.

Next, the rating of participants' aggression disinhibition during the simulation exercise was examined as a predictor of improvements in outcomes. Lower disinhibition, or less "letting loose," predicted reduced posttraumatic

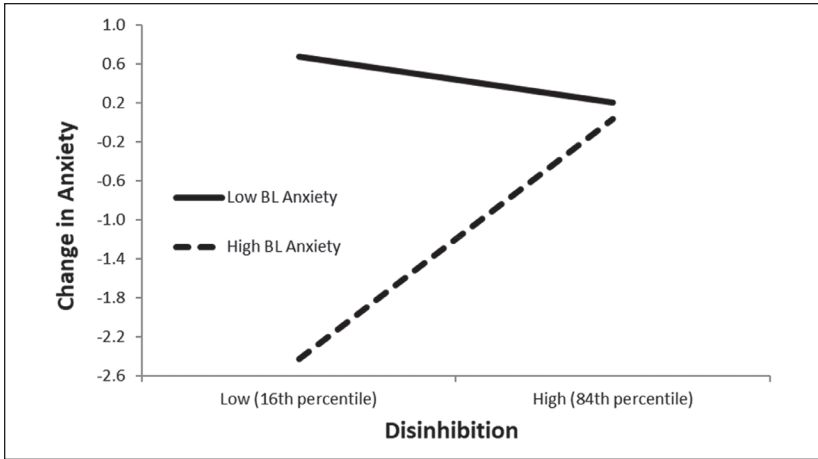


Figure 1. Baseline (BL) anxiety moderates the relationship between disinhibition and change in anxiety.

stress symptoms ($r = .30, p = .01$), anxiety symptoms ($r = .40, p < .001$), and hostility symptoms ($r = .23, p = .047$) at follow-up. These findings indicate that women who reported more inhibition (less disinhibition) of aggression during the simulation experienced more improvement in posttraumatic stress, anxiety, and hostility symptoms than those women who were more disinhibited (aggressive) during the simulation.

We anticipated that the relationship between the degree of disinhibition and subsequent symptom change might depend on baseline levels of participants' symptoms. Analyses revealed that baseline anxiety moderated the relationship between disinhibition and change in anxiety ($b = 0.21, t = 3.99, 95\% \text{ CI} = [0.10, 0.31], p < .001$). Simple slopes analyses indicated that disinhibition during the simulation was significantly related to change in anxiety among those with high baseline anxiety ($b = 1.23, t = 3.38, p = .001$) but not among those with low baseline anxiety ($b = -0.23, t = -0.50, p = .62$). As presented in Figure 1, individuals with high baseline anxiety who showed less disinhibition (i.e., were more inhibited) during the simulation had significantly more reduction in anxiety from baseline to follow up than their more disinhibited (i.e., less inhibited) counterparts, whereas degree of disinhibition was not related to change in anxiety among women who had low baseline anxiety.

Baseline hostility symptoms also significantly moderated the relationship between disinhibition and change in hostility symptoms ($b = 0.14, t = 2.38,$

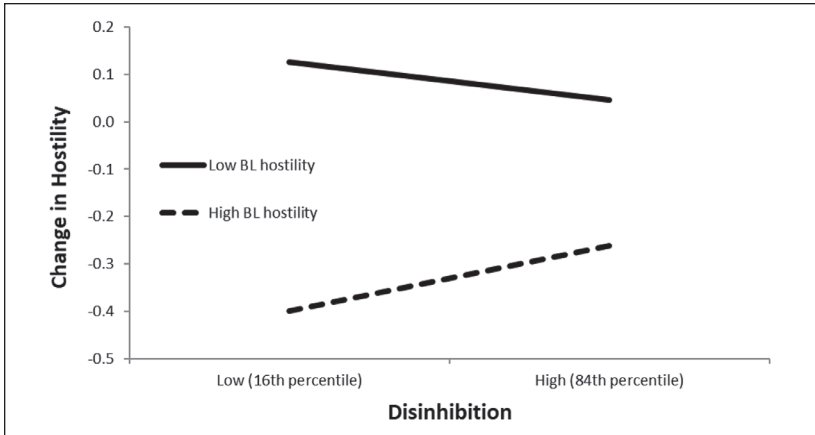


Figure 2. Baseline (BL) hostility moderates the relationship between disinhibition of aggression during the simulation and change in hostility from before to 6 weeks after the RAD course.

$p = .02$). This interaction was similar in pattern and interpretation to that for baseline anxiety, although somewhat weaker, in that neither of the two simple slopes was significant on its own. As shown in Figure 2, however, the greatest reduction in hostility from baseline to follow-up occurred among those women who had relatively high baseline hostility and who were less disinhibited (more inhibited) during the simulation. Baseline post-traumatic stress symptoms did not moderate the relationship between disinhibition and change in post-traumatic stress symptoms.

Discussion

Overall, women benefited from participating in the RAD course. Six weeks after the course, participants reported reductions in posttraumatic stress, somatic, and hostility symptoms and problems with being nonassertive, overly accommodating, and self-sacrificing. These findings are consistent with research linking rape resistance efforts to lower depression, anxiety, and somatic problems (Bart & O'Brien, 1985; Kilpatrick et al., 1989; Ullman & Brecklin, 2002, 2003) and to the small literature examining the effects of self-defense training on anxiety (Ozer & Bandura, 1990; Shim, 1998) and depression (Ozer & Bandura, 1990). Notably, we found no significant multivariate difference in outcomes between women with and without interpersonal victimization histories. This finding suggests that this self-defense training

course is not uniquely beneficial for women with interpersonal victimization histories but also mitigates any concerns that such training may be inappropriate for victimized women.

The RAD course—and self-defense training more generally—appears to be a transformative experience for women, improving a variety of psychological symptoms and interpersonal problems such as unassertiveness or being overly accommodating or self-sacrificing, which may be function as psychological barriers to the forceful resistance of assault. Many aspects of the course reflect approaches used in effective psychotherapy; for example, women are taught how to be assertive (Wolpe, Brady, Serber, Agras, & Liberman, 1973) and to practice shouting “No!” and develop comfort using their voices loudly to assert their boundaries. For women who have been victimized in the past, self-defense training affords an opportunity not only to learn techniques that could protect them from future assault but also to experience the feeling of aggressively defending against a potential attack—and some women may even “rewrite the script” of a past trauma (Smucker & Dancu, 1999), picturing a past aggressor during the simulated assault. Furthermore, this experience takes place in the context of a supportive group of instructors and peers who applaud and reinforce these new ways of behaving and relating with others.

These findings clarify and extend past research on the effects of self-defense classes in important ways. Physical symptoms had not previously been examined as an outcome of self-defense training, and our findings indicate that training reduces not only psychiatric but also somatic symptoms. The reduction in interpersonal problems—being nonassertive, overly accommodating, and self-sacrificing—comports with and extends preliminary qualitative research indicating that women become more assertive and confident about protecting their own needs after self-defense training (Hollander, 2004). The reduction in posttraumatic stress symptoms after RAD supports findings from pilot research with women veterans and suggests that self-defense training may be similarly helpful to civilian women (David et al., 2006).

There was a clear reduction in hostility symptoms among all participants, indicating that the aggressive, anger-activating techniques learned and practiced in self-defense training reduce rather than amplify women’s hostile feelings. This finding stands in contrast to what one might hypothesize given the results of experimental studies of anger expression (e.g., Bushman, 2002). The reduction in experienced hostility among women both with and without victimization histories is notable, given that victimization generates substantial anger (Orth & Wieland, 2006). We think that the expression of anger is

both appropriate and adaptive, especially when conducted in safe, socially sanctioned settings such as the RAD course.

We conducted a novel exploration of the effects of the expression of powerful and aggressive behaviors during the simulation exercise. Interestingly, greater disinhibition of aggression during the simulation predicted less improvement on posttraumatic stress, anxiety, and hostility symptoms. This finding may suggest that the expression of anger or aggression without inhibition is problematic, similar to the assertion of Bushman (2002). Yet the interpretation of this correlation is unclear. For example, heightened disinhibition (anger expression) could be a sign of a woman's unresolved trauma, and a single episode of anger expression could simply prove insufficient to help her, especially without further emotional and cognitive processing. Alternatively, such intense anger expression could be an indicator of problematic emotional functioning that needs cognitive and behavioral regulation strategies rather than expression.

These speculations have some support from moderator analyses of background variables that predicted whether or not disinhibition was helpful for women. The relationship of disinhibition to changes in anxiety depended on women's baseline anxiety, such that women with high baseline anxiety who also were relatively inhibited during the simulation experienced the most reduction in anxiety 6 weeks later. A similar pattern was found for baseline hostility. In contrast, women who were less distressed, as evidenced by lower baseline anxiety and hostility, were able to express aggression with more intensity, which caused no harm and may even have been somewhat helpful. These findings are consistent with Rosenblum and Taska's (2014) proposal that women's "window of tolerance" should be considered in self-defense training. Although they applied this to women with trauma and PTSD symptoms, the same concept likely holds for general anxiety and hostility: some inhibition during the simulation exercise may be protective for women who are highly anxious or angry, whereas women who are less anxious or angry at baseline do not need to inhibit their aggression during the simulation.

Strengths, Limitations, and Future Directions

A key limitation of this study is that we used a nonrandomized, pre-post design with no control group, and thus effects may be overstated or not truly significant; regression to the mean or simply participating in any sort of personal training might have led to some of the observed reductions in symptoms. The small sample size further limits the strength of the conclusions. Results should be viewed with caution until future research clarifies causality by using a randomized design and various control conditions, such

as no-training, education only, or a self-defense course that excludes experiential exercises, which would test the specific contributions of the simulation exercise. Another limitation is that we assessed outcomes at only one timepoint, and additional changes may occur later. We also assessed participants' self-reported disinhibition of aggression during the simulation exercise only at follow-up, which could have allowed some retrospective bias to enter the assessment. Future research should include a real-time assessment of both self-reported and observer-rated disinhibition of aggression and should do so using more than a single item of unknown psychometric quality. The Life Events Checklist is limited for assessing some forms of interpersonal victimization, such as child abuse and sexual assault. Future research should include more behaviorally specific items to ensure that all forms of victimization are properly assessed and should statistically examine more specific or nuanced subgroups based on victimization history. Finally, although our sample included participants who were relatively diverse in ethnicity and reflected a much wider age range than studies that recruited only college students, our sample was somewhat limited in size and, therefore, statistical power. This is especially true when analyses were conducted on the subgroups defined by interpersonal victimization and likely contributed to the nonsignificant MANOVAs on these subgroups.

Findings from this study prompt several exciting future research directions. This is the first study to examine change in somatic symptoms following self-defense training, and future research should explore the impact of self-defense training on physical health in further detail (e.g., chronic health conditions and illnesses, health care utilization). This study also adds to the small literature suggesting that self-defense training may potentially serve as an intervention, or at least augment existing treatments, for women with post-traumatic stress symptoms. Larger randomized controlled trials are needed to verify and extend these preliminary findings. Research should also continue examining who benefits—and who might be harmed—from self-defense training as well as the mechanisms through which these effects occur.

The simulated assault exercise that is conducted during the RAD course was a focus of this study, and it has both strengths and limitations. This exercise affords women the opportunity to practice power and aggression in a realistic way. Yet, the exercise could be modified to increase benefits and limit any drawbacks. For example, the exercise could be tailored to baseline symptoms such as anxiety; women who are very anxious or feel very fearful of participating in the exercise could be reassured that they may choose to aggress in less intense ways to avoid sensitization. Also, a therapist could coach the woman using an individualized, graded approach and provide the opportunity for reflection on her experience of the exercise.

Conclusion

Overall, women who took a RAD training course reported small magnitude decreases in several symptoms, including posttraumatic stress, somatic, and hostility as well as problems being too nonassertive, overly accommodating, and self-sacrificing. Women with interpersonal victimization histories did not have different outcomes than women without such histories. Participation in the assault simulation and the degree of inhibition or disinhibition of aggression during this simulation, however, play a complicated role in outcomes of RAD training. Overall, these findings highlight the benefits of such a course and the potential value of the activation of powerful self-defense techniques in assault simulations in reducing psychological symptoms, including post-traumatic stress symptoms, and improving women's physical health and interpersonal interactions.


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