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Responses to Domestic Violence Public Service Ads:
Memory, Attitudes, Affect, and Individual Differences

A Dissertation

Presented to

the Faculty of Arts and Humanities

University of Denver

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

by

Courtney E. Welton-Mitchell

August 2012

Advisor: Dr. Daniel N. McIntosh

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Abstract

Public service ads (PSAs) are an increasingly visible part of efforts to decrease the occurrence and consequences of domestic violence. Like other advertising, domestic violence PSAs are designed to grab attention, influence attitudes, and enhance memory for ad content. Over the years, images in domestic violence PSAs have changed substantially; agencies have started using pictures that generate emotions – either vivid negative images (bruised faces or body parts), or positive images (smiling faces) that contrast with the negative text. It is not clear, however, how different types of ad images influence memory for the message and attitudes about domestic violence, and what role affect may play in such responses. Moreover, the extent to which individual differences (trauma history, posttraumatic distress - PTSD symptoms) influence outcomes is not known. In three studies with undergraduate and community samples, using methods ranging from psychophysiology to self-report, the impact of images on attitudes and memory for ad content are investigated, also considering affect and individual differences. Results indicate graphic negative images enhanced memory for ad content, are rated as more persuasive, and are more likely to compel the viewer to act. Affective responses to ads also differed based on image type, and in some cases, partially mediated the relationship between ads and outcomes. Trends in the data suggest further study of the role of individual differences (trauma history, PTSD symptoms) is needed. This research provides information specifically relevant to the design of domestic violence

public service campaigns and broadly relevant to understanding the role of emotional responses and individual differences on outcomes associated with public service ads.

Keywords: memory, affect, domestic violence, attitudes, trauma, public service ads

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Table of Contents

List of Appendices.....	vi
List of Tables.....	vii
Overview.....	1
Introduction Study One.....	16
Hypotheses.....	16
Method.....	17
Results.....	26
Discussion.....	37
Introduction Study Two.....	41
Hypotheses.....	41
Method.....	43
Results.....	51
Discussion.....	57
Introduction Study Three.....	60
Hypotheses.....	60
Method.....	61
Results.....	66
Discussion.....	73
General Discussion.....	75
References.....	80
Appendices.....	93
Tables.....	94

List of Appendices

Appendix

Appendix 1: *Domestic/ dating violence on campus vignettes*..... 93

List of Tables

Table

Table 1 (Study 1): <i>Mean Memory Score for Text for all PSAs</i>	94
Table 2 (Study 1): <i>Mean Attitude towards Engagement for DV PSAs</i>	95
Table 3 (Study 1): <i>Mean Psychophysiology Difference Scores for all PSAs</i>	96
Table 4 (Study2): <i>Mean Memory Score for all PSAs, with Comparisons across Conditions</i>	97
Table 5 (Study2): <i>Intervention by Type for Vignettes</i>	98
Table 6 (Study 2): <i>Volunteer Engagement by Category</i>	99
Table 7 (Study 2): <i>Affect as Partial Mediator in Relationship between DV PSA Condition and Memory</i>	100
Table 8 (Study 3): <i>Mean Memory Scores DV PSAs, with Comparisons across Conditions</i>	101
Table 9 (Study 3): <i>Mean Attitude towards Engagement DV PSAs</i>	102
Table 10 (All Studies): <i>Indicating what Memory, Attitudes, Affect, and Individual Difference Variables were Measured in Each Study</i>	103
Table 11 (All Studies): <i>Effect Size for Significant Difference between Bruised and Smiling Face DV PSAs on Outcome Variables</i>	104

Overview

Images that evoke strong emotions are often used in health related public service ads (PSAs) because such images are thought to result in enhanced memory for the ad (Lang, 2006). Such images are often used in combination with fear-evoking text, which has been demonstrated to have the capacity to be persuasive, changing attitudes and intentions (Mongeau, 1998). While the influence of such content on memory and attitudes is assumed to be a result of the emotion such stimuli evoke, which dimensions of affect drive any enhanced memory and influence attitudes remains unclear (see Levine & Pizarro, 2004; Reisberg & Hertel, 2004; Uttl, Ohta, & Siegenthaler, 2006 for reviews). More specific to domestic violence ads, a variety of images have been paired with similar text, and it is also unclear which types of images are most effective. In addition, individual differences (e.g., trauma exposure, post-traumatic symptoms) may influence how some public health messages are remembered and evaluated (e.g., Borzekowski and Poussaint, 1999), although the extent of this influence is unknown.

The three studies that follow address the following questions:

- 1) What types of images in domestic violence PSAs result in enhanced memory for the ad and have the greatest impact on attitudes?
- 2) Do affective responses contribute to domestic violence PSA outcomes?
- 3) Do individual differences in trauma history or post-traumatic symptoms influence responses to domestic violence PSAs?

These three studies examined relationships among domestic violence PSAs, memory and attitudes, dimensions of affect, and individual differences (trauma history, PTSD symptoms). Domestic violence and other types of PSAs were shown to two

samples of undergraduate psychology students and one diverse community sample of low-income women recently exposed to domestic violence. Memory for ads, preference and attitudes about the ads, and intention to respond to domestic violence issues were measured to determine which ads have the greatest impact on viewers. Mediators of the relationships between characteristics of ads and outcomes were examined. Specifically, we examined whether dimensions of affect help drive the relationship between domestic violence PSAs and memory, preferences, and attitudes. Psychophysiology, self-report, and other measures were used to tap affective valence, arousal, and approach/ withdrawal motivation, contributing to the literature on memory and dimensional models of emotion. Finally, individual differences were investigated to determine whether trauma history and post-traumatic symptoms influence responses to domestic violence PSAs.

Domestic Violence Prevalence and Risk Factors

Domestic violence¹ is a significant public health concern in the United States. Just over 22% of women report being physically assaulted by a domestic partner in their lifetimes (Tjaden & Thoennes, 2000). The same report notes approximately 1.3 million women are physically assaulted by a domestic partner annually. Domestic violence is the most prevalent form of violence against women: 64% of women who reported being

¹ The term ‘domestic violence’ is being used throughout this document, consistent with the use of the term in the public service advertising literature (e.g., the NYC Mayor’s Office to Combat Domestic Violence refers to an annual ‘domestic violence’ public awareness campaign: <http://www.nyc.gov/html/ocdv/html/publications/pr.shtml>). However, the author recognizes that ‘intimate partner abuse’ and ‘dating violence’ are terms that may be more appropriate and inclusive, particularly for some of the participants in these 3 studies (e.g., undergraduates).

raped, physically assaulted, and/or stalked in adulthood were victimized by an intimate partner (Tjaden & Thoennes, 2000).

Some groups are at greater risk for domestic violence than others. Women in their early 20's have the highest risk of experiencing nonfatal domestic violence (Bureau of Justice Statistics, 2006). Dating violence among college students in particular is high, ranging from 20-50% (Bryant & Spencer, 2003; see Nabors, Dietz, & Jasinski, 2006 for a review; Straus, 2004). Limited financial resources also appear to be a risk factor for domestic violence, due perhaps to the multiple stressors associated with poverty. Women with low income consistently report higher rates of domestic violence than those with higher income levels (Behavior Research Center, 2005; Bureau of Justice Statistics, 2006; Carlson et al., 2003).

History of Domestic Violence Public Service Ads

Public health campaigns addressing the issue of domestic violence have grown in recent years. Domestic violence PSAs now appear across the United States, often at bus stops, on buses and subway cars. Like other advertising, domestic violence PSAs are intended to grab attention, influence attitudes and enhance memory for ad content. Such ads often encourage persons directly experiencing domestic violence, or those who know someone who is a victim of violence, to call an agency hotline for help (e.g., Alfonso, Shaylor, & Brady, 2009). Despite the popularity of use, domestic violence PSAs, especially those depicting graphic images of injured women, remain controversial, with several citizens groups questioning whether such ads actually achieve the intended results (e.g., Bagozzi & Moore, 1994; Wilonsky, 2008).

To answer the question of whether such ads are effective, the success of most domestic violence PSA campaigns is measured solely by an increase in calls to the hotline during the period the ad is displayed. A comment from a representative for SafeHorizon, the largest provider of domestic violence services in the U.S., illustrates this point. When asked by journalists if domestic violence ads with graphic images work, the staff member replied, "We've done ad campaigns in the past with graphic images of women who've been abused, and our call volume goes way up, so we know there is an impact" (Alfonso, Shaylor, & Brady, 2009, p. 2). However, this provides little information about the relative success of specific domestic violence PSA campaigns (especially given potential confounds influencing call rates during the period the ad is displayed; e.g., other sources of media coverage). In addition, call rates alone do not tell us who is responding to the ads. For example, are more friends and relatives of victims of domestic violence calling the hotlines, or are women directly experiencing domestic violence calling themselves in response to the ads? While calls by family and friends are important, understanding which type of ads are most effective for victims is crucial in developing effective campaigns.

The literature in psychology, mass media and communications, and advertising, show remarkably little outcome research specific to domestic violence public service campaigns; as noted already, evidence is primarily composed of anecdotal reports of increased call volume to agencies during the ad campaign period. In fact, in a comprehensive review paper examining research evidence for the efficacy of public service campaigns over the course of a decade (Atkin, 2001), no mention was made of domestic violence PSAs. However, research with other types of PSAs suggests an ad's

effectiveness depends in part on whether the appeal is appropriate for the intended audience (Atkins, 2001).

What constitutes an appropriate domestic violence PSA campaign (and for which audience – victims, survivors, bystanders, partners) is unclear, with campaign tactics changing seemingly arbitrarily throughout the years. For example, NYC’s annual domestic violence awareness campaign with ads in subways and buses began in 1994 (see NYC Mayor’s Office to Combat Domestic Violence:

<http://www.nyc.gov/html/ocdv/html/publications/pr.shtml>). Since the start of the campaign, NYC has been considered a leader in domestic violence awareness initiatives.

The NYC campaigns have used a wide variety of images to grab attention (accompanying ad text has been less mutable), yet the rationale behind the change in images from one campaign to the next remains unclear. For example, ad images in NYC’s domestic violence PSAs have included women’s bruised faces, bruised body parts, and smiling faces, all accompanying similar text. An ad that ran in 1999, typical of those used in multiple campaigns over the last decade and a half, depicts images of battered women’s faces with the accompanying statistic, "Every 12 seconds, another woman is beaten by her husband or boyfriend." Ads also typically feature an agency name and a phone number for the domestic violence hotline (e.g., in NYC it is ‘800-621-HOPE’). Instead of utilizing images of battered women’s faces, some ads have depicted women’s bruised body parts, e.g., neck, backs, arms, and legs. This was the case with the 2006 NYC campaign depicting portions of bruised women’s bodies in hospital gowns with accompanying statistics on violence and a hotline number. The earlier 2001 NYC PSA campaign however, tried a different approach. Instead of using graphic images of

injured women, smiling women's faces were used to grab attention. Specifically, these ads featured smiling portraits of young women, high school yearbook graduation photos. Next to the images the text read, "most likely to be forced into sex," a play on traditional high school superlatives (e.g., "most likely to succeed"). Additional text included a hotline number urging those in an abusive relationship to call for help. This type of image and text incongruent ad is not unique to NYC. In 2008 a Dallas agency placed similar ads on buses. This time the ads featured images of a smiling child's face with captions that included, "one day my husband will kill me." The same ad included the text "girls who grow up in abusive households are more likely to become victims of violence themselves," with an accompanying agency hotline number urging the viewer to "break the cycle of violence," presumably by calling the hotline. The lack of rigorous outcome research as ads have changed over the years makes it difficult to determine which of these campaigns have been most successful.

Evaluating what type of domestic violence PSAs are most effective can be addressed by considering basic research on memory and emotion. Emotion has been likened to a highlighter, drawing attention to stimuli that are relevant for determining an appropriate response (Levine & Pizarro, 2004). The enhancing effect of emotion on attention, encoding and subsequent retrieval has been attributed to the influence of arousal and valence (positive, negative) on memory; for example, more arousing negative images and words have been associated with enhanced memory (see Levine & Pizarro, 2004, for a review; see Mather & Sutherland, 2009 for a review). The role of approach and withdrawal motivation in cognitive responses such as memory has also been investigated (Cacioppo et al., 2000; Cacioppo & Gardner, 1999). The literature

emphasizing the association between dimensions of affect and memory will be elaborated later in this paper. First, given the history of images used in domestic violence public service campaigns in recent years, it is important to consider how different images may be processed when associated with similar ad text.

Which Type of Images Facilitate Text Processing?

Some research on ads in general suggests ads with incongruent or unexpected image-text combinations (e.g., an image of a smiling woman placed next to domestic violence statistics) may result in greater depth of processing, greater arousal, and more favorable ad persuasion ratings (e.g., Heckler & Childers, 1992). Other research suggests ads with inconsistent images and text may result in increased image based processing and limited attention to accompanying text, especially for low-literate viewers (Jae, DelVecchio, Cowles, 2008). Graphic negative images in particular, may capture limited cognitive resources, resulting in reduced memory for any information accompanying the image (Hutchinson & Bradley, 2009). This suggests that ads with the same text message may be processed in different ways depending on whether the text is accompanied by an image of a bruised face (or body part) or a smiling face. However, it remains unclear whether these results from general consumer advertising apply to domestic violence PSAs. Finally, this literature tells us nothing about how individual differences, other than literacy rates, may influence how graphic images and image-text incongruent ads are processed.

In addition to the potential for an ad depicting an image of a smiling woman to be processed differently from an ad with an image of an injured women, it is possible that

images of faces in an ad (smiling or bruised) may be processed differently than body parts with no faces visible. Research comparing memory for faces with memory for objects indicates faces tend to be more salient and better remembered (see Hanley & Cohen, 2008 for a review). While this might suggest that DV PSAs with faces may be better remembered, face images could conceivably detract from text processing, resulting in better memory for text in ads with no faces (body parts only). Consequently, both faces (smiling and bruised) and non-face images (bruised body parts) were included in this investigation to determine which type of image facilitates processing of accompanying text, specifically which results in better or worse memory for accompanying text, and more or less favorable attitudes towards involvement in domestic violence issues. In addition, across studies memory for the global ad (Studies 2 and 3) as well as the text only (Study 1) was examined.

Finally, domestic violence PSAs are usually displayed in a context that includes other ads competing for attention, and other competing task demands (e.g., talking, reading). Certain types of images may be more attention grabbing than others when viewed in an array with other ads. Therefore to enhance ecological validity, these studies included domestic violence PSAs displayed next to other ads (Study 3) and in an environment where participants had to attend to other tasks during opportunities for ad viewing (Study 2 and 3). Study 1 also exposed participants to a variety of ad types to determine if some types of PSAs (e.g., anti-smoking, state tourism, healthy living) are better remembered than others.

Memory and Attitudes as a Measure of PSA Effectiveness

For the purposes of these three studies the primary outcomes of interest are 1) memory for ad content and 2) attitudes (e.g., about taking action, such as engagement with service providers, persuasion ratings). Examining memory for domestic violence public service ads is consistent with the type of outcome measures used in other advertising and PSA-specific research. Participants have been asked to respond to open ended or free recall memory tasks for ads and related images (e.g., Bagozzi & Moore, 1994; Hamann, Ely, Grafton, & Kilts, 1999); answer a series of true/false questions about facts contained in print ads (e.g., Leigh, Zinkhan, & Swaminathan, 2006; Lescher & Chang, 2009); and perform recognition memory tasks (as a proxy for encoding) such as asking participants to rate whether they have seen an image or ad previously (e.g., Amir, Leiner, & Bomyea, 2010; Fernandez-Rey & Redondo, 2007).

Most advertising research also includes attitude measures, often in the form of engagement with an issue (or product), and persuasion ratings. Attitudes have been investigated by showing participants specific ads and asking them whether they would donate to an associated organization (Twenge et al., 2007), or help abused children through a series of options for becoming involved (Bagozzi & Moore, 1994). Persuasion has been examined in anti-smoking PSAs by asking viewers to rate how persuasive and convincing they find an ad for themselves and for others (Rhodes, Roskos-Ewoldsen, Edison, & Bradford, 2008).

Dimensions of Affect

Answering the question of which domestic violence PSAs are associated with the most favorable memory and attitude outcomes still leaves unanswered the question of *mechanism*. Research suggests emotional responses are likely to be driving the relationship between specific types of PSAs and outcomes. For example, in a study on child abuse prevention PSAs, negative emotions (e.g., anger, sadness, fear, tension) mediated the effects of viewing a victim of child abuse on decisions to help (Bagozzi & Moore, 1994). This indicates that ad-induced negative emotions may influence cognitive responses, suggesting that outcomes associated with domestic violence PSAs may be primarily attributable to the affective reactions the ad evokes.

While an extensive body of research supports the notion that emotion enhances memory, especially for highly arousing and negatively valenced stimuli (see Mather & Sutherland, 2009 for a review), it is often difficult to determine the unique contribution of valence or arousal to memory outcomes. Some researchers have suggested arousal clearly plays the primary role, “arousal induced by emotional stimuli rather than their emotionality per se drives subsequent recall” (Banich et al., 2009, p. 623). Yet, an arousal-only account would predict that comparable levels of arousal produce a similar enhancing affect for any valence of stimuli encountered. This disregards a body of research on the influence of valence on memory which illustrates that highly arousing pleasant and highly arousing aversive/ negative stimuli are not associated with the same memory outcomes (see Levine & Pizarro, 2004, for a review; Levine & Burgess, 1997; Tiedens & Linton, 2001). While some researchers believe valence (controlling for arousal) may instead drive memory for specific stimuli (see Kensinger, 2009 for a

review), others suggest it is the combination that drives memory outcomes, with better memory for certain types of stimuli primarily attributable to the high degree of arousal some negatively valenced stimuli evoke (e.g., Bolls, Lang, & Potter, 2001; Kensinger & Corkin, 2003; Mather & Sutherland, 2009).

More recently, the role of approach and withdrawal motivation in cognitive responses, such as memory, has also been investigated. Some studies suggest that the most important dimension of affective responses to stimuli may be activation of the appetitive (approach) and aversive (withdrawal) motivational systems (Cacioppo et al., 2000; Cacioppo & Gardner, 1999). Cacioppo and colleagues argue that the appetitive and aversive motivational systems are distinct from valence and arousal dimensions of affect (Cacioppo et al., 2000; Cacioppo & Gardner, 1999). These motivational systems respond to detect risk and maximize opportunity. At low levels of arousal, the appetitive motivational system is thought to be more active than the aversive system (Cacioppo & Gardner, 1999). The aversive (withdrawal) system is also thought to respond more quickly than the appetitive (approach) system, accounting for the ‘negativity bias’ (Cacioppo, Larsen, Smith, & Berntson, 2004). Negative, highly arousing stimuli may be better remembered because this type of stimuli often immediately activates the aversive (withdrawal) motivational system (Bradley, Angelini, & Lee, 2007).

In order to determine what type of domestic violence PSAs work, responses to PSAs across affective dimensions were examined. Because the literature is unclear about the contribution of a specific dimension of affect to memory outcomes, three dimensions discussed most often in the literature were investigated (valence, arousal, and motivation).

Individual Differences

Consumer research indicates the most effective advertising campaigns are those designed for and tested on a specific target audience (Atkins, 2001). This suggests determining which domestic violence PSAs are most effective must involve understanding how women who have experienced domestic violence respond to such PSAs.

Although there does not appear to be any research on how women with a history of domestic violence respond to domestic violence PSAs, at least one study has examined the role of violence exposure in responses to anti-violence television PSAs. Research examining ads aimed at discouraging street violence among youth indicates that violence exposure results in teenagers finding some anti-violence PSAs less interesting and less understandable. Those with a history of violence exposure are also less likely to think the message is believable or will have an effect on others (Borzekowski & Poussaint, 1999). Research has also examined the influence of individual differences in responses to other types of PSAs; differences have been found in how smokers and nonsmokers process anti-smoking PSAs (Rhodes, Roskos-Ewoldsen, Edison, & Bradford, 2008). This underscores the importance of examining individual differences to determine if these may influence responses to domestic violence PSAs.

Trauma history. Research outside of advertising also indicates that individual differences (e.g., trauma exposure) may influence responses to domestic violence PSAs. Persons with a history of trauma exhibit either better or worse memory for trauma-related stimuli compared with controls with no history of trauma exposure (see Goodman, Quas, & Ogle, 2009 for evidence for both directions). College students who have experienced

dating violence differ in their attitudes and beliefs about domestic violence compared to those with no personal history (e.g., Bryant & Spencer, 2003). It is unclear whether persons with a specific history of domestic violence, or a history of interpersonal trauma, will respond differently to domestic violence PSAs compared to those with no similar history; it is also unclear whether cumulative interpersonal trauma or type of domestic violence exposure may be related to memory for domestic violence PSAs or associated attitudes. As a result, cumulative interpersonal trauma, and specific domestic violence exposure (psychological aggression and physical injury) were examined in the three present studies to determine what individual difference trauma exposure characteristics influence responses to domestic violence PSAs.

Post traumatic stress disorder (PTSD). In addition to trauma history, associated symptoms are likely to influence responses to domestic violence PSAs. In particular, PTSD has been implicated in memory performance, associated with both enhanced and impaired memory for trauma-related stimuli. PTSD has been associated with improved memory for trauma related stimuli across numerous studies (see Combs & DePrince, 2010 for a review). Persons with PTSD selectively attend to and process what is perceived as threat related (Chemtob et al., 1988; Kimble et al., 2002; Pine et al., 2005; McNally, Clancy, Schacter, & Pitman, 2000; Vrana, Roodman, & Beckman, 1995). As a result of this increased attention, memory for trauma-relevant (i.e. threatening) information may be enhanced (see Goodman, Quas & Ogle, 2009 for a review). Those with PTSD may also use avoidant strategies to limit attention given to trauma-related cues, resulting in reduced memory for trauma-related compared to other types of stimuli

(Fraleay, Garner, Shaver, 2000; Mikulincer & Shaver, 2008; see Goodman, Quas, & Ogle, 2009 for a review).

Both trauma exposure and PTSD may influence psychophysiological reactivity (EMG, skin conductance, heart rate) to trauma-related stimuli (see Combs & DePrince, 2010 for a review). Recently, Combs & DePrince (2010) underscored the need for more research to determine the influence of both trauma exposure and PTSD in physiological responses to trauma-related stimuli. Although not associated with primary hypotheses, exploratory analysis will involve examination of psychophysiology responses based on trauma history and PTSD symptoms.

Those with a history of domestic violence or other interpersonal trauma must respond to and interact with violence-related stimuli regularly. This includes domestic violence PSAs on buses and subway cars encouraging viewers to access resources. Yet, it is not clear how cumulative interpersonal or domestic violence specific trauma exposure, or PTSD symptoms, may influence responses to such ads. In order to determine which PSAs are most effective, we investigated whether these individual differences factors influence responses to domestic violence PSAs.

Summary

Given the importance of examining responses to domestic violence PSAs (memory, attitudes, affect, and individual differences) for designing effective public health campaigns and the limited and equivocal research in this area to date, this research makes a meaningful contribution to the literature. Studies 1-3 provide results highlighting which type of ad images results in better memory for domestic violence PSAs, more

engaged attitudes towards service providers, and more favorable attitudes towards specific ads (e.g., persuasion ratings). These studies also emphasize how affective dimensions influence memory and attitude outcomes. Finally, examination of individual differences (interpersonal trauma history, including domestic violence, and associated symptoms) allows for understanding whether PSAs should be tailored to meet the needs of a specific audience. Understanding specific content of PSAs that may have an impact on risk for future violence exposure in high risk populations (e.g., undergraduates; low-income women with a history of recent domestic violence) will guide us in the process of developing effective domestic violence PSA campaigns.

Study 1: Introduction

Three types of images often used in domestic violence PSAs (bruised faces, smiling faces, bruised body parts) were utilized to determine relative influences on memory for ad *text* and attitudes towards domestic violence agencies (intention to call, donate to, or volunteer with a particular agency). Psychophysiology measures (electromyography/EMG, electrodermal response/EDR, electrocardiogram/ECG/heart rate) were used to investigate affective responses to PSAs utilizing a dimensional model (valence, arousal, and approach/withdrawal motivation). Individual differences were examined (history of interpersonal trauma exposure, posttraumatic distress symptoms), to determine if these influenced responses to PSAs. Results suggest differences between DV PSAs in memory for ad text, attitudes about calling or donating to an agency, and psychophysiology (affective) responses (heart rate), with bruised face and bruised body images associated with the strongest responses and most favorable outcomes. Affect did not mediate the relationship between DV PSA image type and outcomes. A trend suggested those high in interpersonal trauma had worse memory for *text* accompanying bruised faces and better memory for *text* associated with smiling faces.

Study 1 Hypotheses

Domestic Violence Ads, Memory, Attitudes. Hypothesis 1: *Memory and attitude outcomes were expected to differ based on DV PSA image types. Some studies suggest bruised faces, others suggest smiling faces, and still others suggest an image other than faces, will result in better memory for ad text and more favorable attitudes*

towards domestic violence agencies associated with a particular ad. As a result, the specific direction was not predicted.

Dimensions of Affect. Hypothesis 2: *Affective responses were expected to mediate the response between DV PSA image type and memory and attitude outcomes.* More negative valence (increased corrugator and decreased zygomatic activity), greater arousal (increased EDR/ skin conductance level), and/or greater withdrawal responses (decreased heart rate) were expected to drive higher memory scores and to influence attitudes. The direction for attitudes was not predicted because the literature is unclear about how affective dimensions and attitudes may be related.

Interpersonal Trauma History and Symptoms. Hypothesis 3: *Trauma-related variables were expected to moderate the relationship between DV PSA image type and memory, and attitudes.* No specific directions were predicted because the literature is mixed, with some research suggesting those with a specific trauma history will exhibit better memory for trauma-related stimuli and other research suggesting the opposite. The symptom literature is also mixed, with post-traumatic symptoms (e.g., PTSD) associated with both better and worse memory for trauma-related stimuli.

Method

Participants

Sixty-eight undergraduate volunteers between the ages of 18 and 41 (Age $M = 20.93$; $SD = 3.22$) were recruited from psychology courses, receiving credit as compensation for their time. Demographic characteristics were consistent with that expected based on the university's undergraduate population typically enrolled in psychology courses: 79% female, 21% male; 79% White, 9% Asian, 3% African-

American; 1% Native American, 7% Hispanic/Latino; 87% were Native English speakers (non-native speakers reported fluency in English). Participants were randomly assigned to one of three domestic violence (DV) PSA image conditions, resulting in the following distribution of participants: bruised face condition $n = 23$; smiling face condition, $n = 24$; and bruised body condition, $n = 21$.²

Stimulus Materials

Although all ads were created by the researcher, much of the ad content is pulled from actual ads. For example, all images of women with bruised faces were taken directly from a 2007 domestic violence print campaign that ran in the U.K. sponsored by the charity *Women's Aid* (<http://www.womensaid.org.uk/>). A total of 7 images were created for bruised face, smiling face, and bruised body DV PSAs, for a total of 21 DV PSA images. Each bruised and smiling face image was matched for hair color and style, eye color (dark or light) and skin color. Pilot data indicate that images within the subtype are well matched; in other words, psychophysiology responses across multiple measures are not significantly different for various bruised face, smiling face, and bruised body images within the subcategory. There were a few images that could be interpreted as Hispanic, two that featured African American women, and the remainder appeared Euro-American/White.

² Groups did not differ significantly by age [$F(2, 64) = .38, p = .67$], gender [$F(2, 65) = 1.47, p = .24$], or ethnicity [$F(2, 65) = 5.63, p = .57$].

In addition to three image types common in domestic violence PSAs (bruised faces, bruised body parts, smiling faces)³, additional PSAs (smoking: faces wearing oxygen masks, smiling faces; neutral⁴: state tourism landscape images, healthy living fruit and vegetable images) were added for the purpose of distraction and comparison. All ads are in black and white with the same spatial layout (image in left corner and text on right), with images matched across conditions, to control for potential confounds (e.g., layout, color, size and orientation of face). The text is matched for word count and content within a subcategory, although the content of DV, smoking, and neutral (landscape, healthy living) PSAs necessarily differs based on subject matter (e.g., landscape ad text: “Annually over two hundred million visits are made to national forests.” ; domestic violence text: “Over one million women are victims of a physical assault each year.”). The text for each slide contained a quote, statistic, hotline number, and an agency name. Although black and white PSAs may not be as attention grabbing as color ads, they do allow for greater attention to specific ad components (Goodman, 2002).

Procedure

Participants completed a computer task in which they viewed, in random order, domestic violence, smoking, healthy living, and state tourism PSAs (note: within a

³ For example, NYC’s annual domestic violence PSA campaigns have included these types of images, all accompanying similar text (see NYC Mayor’s Office to Combat Domestic Violence: <http://www.nyc.gov/html/ocdv/html/publications/pr.shtml>).

⁴ Although labeled ‘neutral’ these ads are actually mildly pleasant given the subject matter (landscape, fruit, vegetable images).

subcategory - e.g., domestic violence - images were randomly assigned to accompanying text to avoid potential confounds associated with text content). Throughout viewing participants wore electrodes to measure various dimensions of affect. Before being shown the PSAs each participant was shown 10 neutral images from the International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 2005). This ‘resting period’ was used as a baseline reference for changes in psychophysiological responses during PSA viewing.

Section 1. Each participant was shown 7 PSAs in random order in the first, “naïve” section (when participants did not know to expect a memory test): 3 domestic violence PSAs (1 bruised face, 1 smiling face, 1 bruised body part); 2 smoking PSAs (face wearing an oxygen mask, smiling face); one state tourism PSA (landscape image); one healthy living PSA (fruit/vegetable image). Each PSA was displayed for 12 seconds followed by an 8 second wait interval during which participants viewed a black screen. The display and wait period were set during pilot testing and were intended to provide both enough time to process the entire PSA, and enough time for psychophysiology response and recovery (especially for skin conductance). A cued recall task for the PSAs was then administered; participants were asked to recall ad *text* using the image and a generic ad layout as a guide.

Section 2. In the second section 12 new ads were shown: 6 domestic violence PSAs and 6 smoking PSAs (3 with oxygen masks, 3 smiling). Which 6 domestic violence PSAs participants viewed depended on condition; participants were randomly assigned to view images associated with one of 3 domestic violence conditions (A = bruised faces; B = smiling faces; C = bruised body parts); ad text was randomly assigned to images within

the sub-category and remained constant across conditions. After completing this section of computer-based PSA viewing, electrodes were removed and participants completed a final cued recall task (asked to recall ad *text*) for the 6 domestic violence and 6 smoking ads.

Section 3. Following the second section, participants completed attitude ratings (intent to call, donate, or volunteer) for 3 new ads - one of each type of domestic violence PSA (bruised faces, smiling faces, bruised body parts) randomly paired with text.

Section 4. Finally participants completed a series of questionnaires including trauma history and PTSD symptoms. Upon completion of the study protocol, participants were debriefed on the purposes of the study and given domestic violence and smoking-related resource fliers. These fliers contained accurate information about local and Internet-based resources.

Measures

Cued recall. The images viewed previously by participants were provided as a retrieval cue during the testing phase (e.g., specific bruised face image associated with particular text). A generic slide layout was also provided for reference to assist in recall of various sections of PSA text (e.g., quote, statistic, hotline, agency name). Independent raters scored remembered text associated with each image (15% double coded for reliability, inter-rater agreement was 83% overall, and 97% for agreement within .25 points). Points were awarded for remembering components of the 1) tag line (1 point); 2) statistic (1 point); 3) hotline information (1.5 points); 4) agency name and address (1.5 points), for a total of up to 5 points per PSA (coding details available from author). A composite memory detail score was obtained by summing the total points for the PSAs

within an image category for analysis (e.g., bruised faces, smiling faces, bruised body parts; smoking oxygen mask, smoking smiling faces; neutral/ distractor ads).

Intent to act (call, volunteer, donate). After viewing one of each type of new domestic violence PSA (text randomly associated with image) - bruised face, smiling face, bruised body part image, participants indicated 1) likelihood of calling the agency hotline number if they or someone they knew were in an abusive relationship; 2) willingness to donate money to this agency; 3) willingness to volunteer with this agency (assuming they were to volunteer with some agency). The scales ranged from 1-5 (e.g., not at all likely to extremely likely).

Participants then rank ordered DV PSA types in terms of preference for calling, donating, and volunteering with an associated agency (randomly assigned to image). This attitude measure was designed for the purpose of this study. Similar types of single item measures have been used to measure related constructs (e.g., donations; Twenge et al., 2007; decision to help abused children; Bagozzi & Moore, 1994).

Valence. EMG, a measure of muscle activation, has been demonstrated to be a reliable measure of the valence of an emotional response (Cacioppo, Petty, Losch, & Kim, 1986; Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005). Valence was measured using EMG of facial muscle activity continuously recorded (at 2000 Hz with a 10-Hz to 500-Hz bandpass filter and a 60-Hz notch filter using a Biopac amplifier and Acqknowledge software) to collect averages throughout computer viewing. Muscle activity was recorded for the two muscle groups individually, over the brow (corrugator supercillii) and cheek (zygomaticus major) regions, using two 4mm Ag/AgCl surface electrodes filled with highly conductive electrolyte gel. Prior to attaching electrodes,

associated surface skin areas were gently abraded with Nuprep gel to reduce impedance. Electrodes were placed approximately 1 cm apart (center to center) parallel to the length of the muscle on the left side of the face, following standard procedures (e.g., Moody, McIntosh, Mann, & Weisser, 2007).

For each specific PSA, the prestimulus activity (500 ms before the onset) was subtracted from the poststimulus activity (3 s after onset) to measure activity caused by viewing each type of stimulus (i.e., to calculate the change from baseline). A mean level of activity for each muscle group was then computed. The difference in mean corrugator activity and mean zygomatic activity was then obtained to assess overall facial muscle pattern associated with valence. The scale is such that predominance of corrugator activity (negative valence) is represented by positive numbers, whereas predominance of zygomatic activity (positive valence) is represented by negative numbers. Higher scores thus indicate more negative valence.

Arousal. EDR measures the autonomic nervous system (sympathetic activity), and is a reliable measure of arousal (Dawson, Schell, Filion, 2007). EDR was obtained using Ag/AgCl electrodes filled with conducting biogel and attached with a Velcro strap to the surface of the distal phalanges of the second and third fingers of the nondominant hand. Prior to attaching electrodes the participant washed their hands (with a PH neutral soap) to reduce impedance. Electrodes were secured with slight pressure to the fingers using the Velcro straps. EDR was continually recorded (at a sampling rate of 2000 samples per second using a 10-Hz low and .5-Hz high pass filter and a gain setting of 5 $\mu\text{mho}/\text{V}$ using a Biopac amplifier and Acqknowledge software). EDR was analyzed using Acqknowledge software to obtain peak magnitude and number of peaks following

stimulus presentation (12 s⁵) subtracted from the same variables during the baseline period derived from the neutral IAPS.

Mindware (for EMG) and Acqknowledge (for EDR) software were used to visually inspect the data for noise and artifacts. Next, the waveform around each stimulus presentation was visually inspected by a research assistant, blind to hypotheses, to look for artifacts and irregular waveforms. Sweeps that contain clearly abnormal waveforms were dropped from the analyses. No more than 10% of the sweeps for each individual were dropped due to artifacts. Some EMG and EDR data were missing in part, or entirely, due to equipment malfunction. When this is the case it has been noted in the results section.

Approach/ Withdrawal Motivation. Motivation can be measured by electrocardiogram (ECG). ECG is a measure of the autonomic nervous system, both sympathetic and parasympathetic activity. Several studies have used heart rate deceleration or acceleration as a measure of motivation, with deceleration appearing to be more common in response to aversive/ withdrawal rather than appetitive/approach stimuli (Balconi, Brambilla, & Falbo, 2009; Cacioppo et al., 2000; Cuthbert et al., 2000; Bradley & Lang, 2007; Pastor et al., 2008). ECG was obtained using Ag-AgCl disposable electrodes using a modified Lead II ECG configuration on the torso, as has been used successfully in other psychophysiology labs in the DU psychology department (e.g., Mauss & Butler, 2010). In order to allow the participant to move one arm during the stimulus presentation (to press the space bar), torso ECG sensor placement was used to

⁵ The post stimulus window for skin conductance is larger than for EMG because EDA has a relatively slow onset.

maximize convenience (not having the lead wires in the way of the hands), and minimize hand/arm movement related artifacts. This placement has been recommended by other researchers (e.g., Mendes, 2009). ECG electrodes were placed below the right clavicle and under the left ribcage. ECG was continuously recorded (at a sampling rate of 2000 samples per second using a .05 Hz high and low pass filter of 35 Hz with a Biopac amplifier and Acqknowledge software). Following data collection, heart rate in beats per minute (HR) (time between R-spikes expressed in milliseconds) was examined. R-spikes in the post-stimulus window were automatically tagged (using Acqknowledge software). The waveform around each stimulus presentation was then visually inspected by a research assistant blind to hypotheses, to look for improperly tagged R-spikes (that may instead be movement artifacts). These were manually corrected. For heart rate, the neutral IAPS images baseline was subtracted from the total (12s) stimulus response to adjust for individual differences.

Trauma History Questionnaire. The Trauma History Questionnaire (THQ; Green, 1996) was administered to collect information on trauma exposure. The THQ includes 24 items addressing a range of traumatic events in various areas including crime-related events, general disaster, and unwanted physical and sexual experiences. Participants indicated whether each item happened to them, and if so, the number of times and approximate age(s) of occurrence. For the purpose of this study the following items were used to create a cumulative interpersonal trauma variable: items 1-4 tapping mugging, robbery, break-in, and items 18-23 tapping sexual and other types of physical assault by strangers, family or friends (total number of times summed for items 1-4 and

18-23 summed, those reporting nothing on these items were included in the analysis with a 0 score).

Posttraumatic Diagnostic Scale. The PDS is a 28-item measure with items corresponding to DSM-IV-TR criteria for posttraumatic stress disorder (PTSD), including symptoms of reexperiencing, avoidance, and hyperarousal. The PDS has been shown to have high diagnostic agreement with structured clinical interviews assessing PTSD (Foa et al., 1997), and has been used with samples of female domestic violence survivors (Griffin, Resick, Ullmansiek, & Mechanic, 2004). The following instructions were provided to participants, *Below is a list of problems that people sometimes have after experiencing a traumatic event. Read each one carefully and choose the answer (0 – 3) that best describes how often that problem has bothered you IN THE PAST MONTH. Rate each problem with respect to the most severe traumatic incident that you have experienced.* As is typical, the measure was scored by summing symptom items (1-17) corresponding to total PTSD, for a possible range from 0-51. For the current study Cronbach's $\alpha = .87$ was very good.

Results

Prior to analysis, variables of interest were examined for violations of statistical assumptions (e.g., skew, kurtosis, extreme outliers). Extreme outliers (more than 3x interquartile range) were Winsorized to 2.5 SD above/below the mean, bringing skew and kurtosis within acceptable limits. Few outlier modifications were necessary. Those that were made (for psychophysiology variables) are noted in specific sections. Modifications of outliers for psychophysiology variables did not change the pattern of any primary

findings. As a result analyses with outliers modified are reported throughout the results section.

Differences in sample size are reported in each section. When the sample size for a given variable or analysis differs from the overall sample size ($N = 68$), this indicates missing data. Reasons for missing data include participants skipping some questionnaires or items and equipment malfunction for psychophysiology data (e.g., loose electrodes).

For all ANOVAs Levene's Test (one-way, between groups) for homogeneity of variances and Mauchly's test for Sphericity (repeated measures, within groups) were utilized. For violations of homogeneity of variances the *equal variance not assumed* option in SPSS was used. For violations of Sphericity, Greenhouse-Geisser correction was utilized. A standard value $\alpha < .05$ was used as reference for significance. The actual p values are reported throughout the results section.

Where an omnibus ANOVA was run, follow up tests were utilized for comparisons associated with a priori expectations of difference (regardless of whether the ANOVA was significant)⁶. Simple contrasts were used to compare means for separate DV PSA groups.

For some categorical variables chi-square goodness of fit was utilized. If assumptions necessary for chi-square were not met (e.g., cell size count < 5), a Fischer's exact test was used. Where significant results were obtained, effect sizes (Cohen's d) were reported.

⁶ Comparisons were planned between all image groups (bruised face, smiling face, bruised body) in advance.

Memory

Cued recall. Memory for *text* associated with images was measured. See Table 1 for descriptive statistics for within and between conditions for all PSA ad types.

Within groups. Data from Section 1 were analyzed using a repeated measures ANOVA to examine memory scores for the three types of DV PSAs. The ANOVA indicated the images were significantly different [$F(2, 134) = 8.42, p < .001$]. Follow up planned simple contrasts indicated all image types for domestic violence PSAs differed significantly from each other. Participants had the best memory for text accompanying the bruised body ($M = .81, SD = .61$), then bruised face ($M = .52, SD = .54$), and finally, the smiling face image ($M = .29, SD = .40$). Cohen's effect size value indicated a moderate effect size for the mean difference between both 1) bruised body and bruised face images ($d = .50$) and 2) bruised face and smiling face images ($d = .48$).

Between groups. For Section 2, a one-way ANOVA was performed to compare cued recall memory scores for the three types of DV PSAs. Although the omnibus test was not significant [$F(2, 65) = 2.17, p = 0.12$]⁷, follow up planned simple contrasts indicated significantly better memory for bruised body ($M = 4.21$ ⁸, $SD = 1.91$) compared to bruised face ($M = 3.01, SD = 1.93$), but no significant difference between smiling face

⁷ Many have recommended use of planned comparisons regardless of the significance of omnibus tests (e.g., Loftus, 1996).

⁸ The scale for cued recall within groups is 0-5, and for between groups is 0-30. This is due to the difference in number of images displayed in each condition (sum totals used). Means for the between condition are provided here for comparison with the single item within condition: bruised face $M = .50$ ($SD = .32$); smiling face $M = .59$ ($SD = .32$); bruised body $M = .70$ ($SD = .32$).

($M = 3.50$, $SD = 1.92$) and bruised face ($M = 3.01$, $SD = 1.93$). The effect size for the difference between bruised body and bruised face means was moderate ($d = .63$).

Additional Memory Analyses. Differences on memory scores (*within* condition) were examined for the seven PSAs (e.g., bruised face DV, smiling face DV, bruised body DV, smoking oxygen mask, smoking smiling face, neutral landscape, neutral healthy living with fruits/vegetables). A repeated measures ANOVA was significant, [$F(1, 402) = 9.91$, $p < .001$]. Simple follow up contrasts indicated the two types of smoking ads were not significantly different from each other, although trending for the within condition ($p = .052$ within; $p = .27$ between), nor were the two types of neutral ads ($p = .08$). The bruised face DV PSAs were significantly different from landscape ads ($p = .001$), but not from other non-DV ads (p range .07 -.41). The bruised body DV PSA differed significantly from both types of smoking ads, but did not differ from either of the neutral ads.

Attitudes

Attitudes about taking action. Reported intent to *call*, *donate*, or *volunteer* with the agency paired with one of the three types of DV PSAs was measured using both rating scale and forced choice (rank order). See Table 2 descriptive statistics for all PSA types.

Within groups ratings. A repeated measures ANOVA was used to compare the influence of image type on attitudes (scale ratings) towards engaging with a service agency. There were no significant differences between the three image types on willingness to *call*, *donate*, or *volunteer* with a particular agency (p values between .31-

.99). Follow up contrasts also indicated no significant differences between 1) bruised face and bruised body images, or between 2) bruised face and smiling face images.

Within groups rank preference. To compare forced choice rank preference for engaging with a service agency (call, donate, volunteer) by DV PSA type (see Table 2), a Friedman test was used (comparable to a repeat measures ANOVA for rank data). For follow up comparisons a paired Wilcoxon signed rank test was used (to compare if ranks differ).

A Friedman test indicated a significant difference in rank *call* preference between groups $\chi^2(2, N = 67) = 6.34, p = .04$. A follow up paired Wilcoxon signed rank test indicated there was a significant differences in *call* rankings for 1) bruised face and smiling face ads ($Z = -2.18, p = .03, d = .56$), but not for 2) bruised face and bruised body ads ($Z = -.725, p = .47$). Bruised face DV PSAs were most frequently ranked first in *call* preference (46%). Smiling face ads were ranked third most often (49%).

A Friedman test indicated a significant difference in *donate* rank preference between groups $\chi^2(2, N = 67) = 7.92, p = .02$. A follow up paired Wilcoxon signed rank test indicated there were no significant differences in *donate* rankings between 1) bruised face and smiling face ads ($Z = 11.39, p = .16$), or 2) bruised face and bruised body ads ($Z = 1.16, p = .24$). The significant difference was between smiling face and bruised body donate rank preferences ($Z = 2.76, p < .01, d = .72$). Smiling face ads were ranked third most often (51%), and bruised body ads were ranked second most often (45%).

A Friedman test indicated no significant difference in *volunteer* rank preference between groups $\chi^2(2, N = 67) = .21, p = .09$. A follow up paired Wilcoxon signed rank test indicated there were no significant differences in volunteer rankings between 1)

bruised face and smiling face ads ($Z = .22, p = .83$), or 2) bruised face and bruised body ads ($Z = .49, p = .62$).⁹

Affect

Psychophysiology variables. Valence (using EMG), Arousal (using EDR), and Motivation (using ECG, heart rate, HR) were measured. See Table 3 for descriptive statistics for EMG, EDR, and HR for all PSA types.¹⁰

Within groups. Using data from Section 1, a series of repeated measures ANOVAs were performed to compare psychophysiological responses (EMG, EDR, HR) to the three types of DV PSAs. The ANOVAs indicated neither EMG nor EDR (using peak magnitude) were significantly different for the three types of DV PSAs (p values between .71-.86). Planned contrasts for EMG and EDR with bruised face as the reference point for comparison with smiling face and bruised body were not significant (p values between .59-.97).

The ANOVA indicated HR was not significantly different for the three types of DV PSAs, [$F(2, 114) = .29, p = 0.06$], although there was a trend. However, as displayed

⁹ It was anticipated that we could also investigate behavioral measures of attitudes towards DV information seeking (by DV PSA image condition). We gave participants DV information fliers during the debriefing and tracked whether participants threw the fliers away upon exiting the building. Only 9 out of 68 participants (13%) threw away fliers shortly after the study. The same number of fliers were thrown away for each of the three groups.

¹⁰ Extreme outliers (more than 3x interquartile range) were Winsorized to 2.5 SD above/below the mean, bringing skew and kurtosis to within acceptable limits. For EMG, 3 cases were modified for specific PSAs: 1 for bruised face DV ads, 1 for smiling face DV ads, and 1 for bruised body DV ads. For EDR, 14 cases were modified for specific PSAs: 2 for bruised face DV ads, 2 for smiling face DV ads, 1 for bruised body DV ads, 1 for smoking oxygen mask ads, 3 for smoking smiling face ads, 2 for landscape ads, 3 for healthy eating ads. For heart rate, 1 case was modified for smoking smiling face ads.

in Table 3, follow up planned simple contrasts indicated that HR was significantly lower during bruised versus smiling face ads ($p = .02$), with a decrease in HR compared to baseline while viewing bruised face DV PSAs and an increase while viewing smiling face ads. Cohen's effect size value indicated a small to moderate effect size $d = .32$. The difference between bruised face and bruised body ads was not significant ($p = .06$).

Between groups. Data from Section 2 were analyzed with a series of one-way ANOVAs comparing psychophysiological responses (EMG, EDR, HR) to the three types of DV PSAs. Neither EMG nor EDR were significantly different for the three types of DV PSAs (p values between .40-.96). Follow up planned simple contrasts also indicated no significant differences in EMG or EDR between groups with bruised face as the reference point for comparison with smiling face and bruised body (p values between .34-.79).

The ANOVA indicated HR was not significantly different for the three types of DV PSAs, although there was again a trend [$F(2, 55) = 3.16, p = 0.05$]. However, follow up planned simple contrasts again showed that HR was significantly lower during bruised face than during smiling face ads ($p = .02$), but not between 2) bruised face and bruised body ads ($p = .14$). Cohen's effect size indicated a moderate effect size $d = .66$.

Additional Psychophysiology Analyses. A series of repeated measures ANOVAs were utilized to compare average psychophysiology scores for the seven types of PSAs. Bruised face was used as the reference category. There were no significant differences between bruised face DV PSAs and other any PSAs on EMG responses. Heart rate differed for bruised face and both types of smoking ads, and the neutral

landscape ad. There were no significant differences in EDR responses for bruised face ads compared to all others (see Table 3).

Effect of affect on memory, within groups. To determine whether affect was a significant predictor of memory for DV PSAs (Section 1), three separate simultaneous regressions were run, each regressing memory for the DV PSA type (bruised face, smiling face, bruised body) on EMG, EDR, and heart rate responses for the specific image. None of the three regressions were significant (p values between .08-.77, $p = .08$ was for smiling face memory).

Between groups. Data from Section 2, were analyzed using an SPSS macro to test mediation (MEDIATE; Hayes & Preacher, 2011). The macro conducts mediation analysis (single and multiple mediators) with continuous, dichotomous, or multicategorical independent variables (and includes tests for partial mediation, even in the absence of direct effects). When analyzing the effect of the multicategorical independent variable “Condition,” MEDIATE was directed to automatically generate variables using sequential coding (dummy coding, with one variable treated as the IV and the other as the covariate). Percentile bootstrapping (5000 samples) and Monte Carlo confidence intervals were used to examine indirect effects.

Affect did not substantially mediate the relationship between DV PSA image type (condition) and memory for DV PSAs. None of the coefficients for psychophysiology variables were significant: EMG $p = .09$; EDR $p = .42$; HR $p = .52$. Examination of indirect effects indicate all confidence intervals (95%) contained 0: EMG (C.I.s -.41-.48, -.28-.49); EDR (C.I.s -.22-.21, -.49-.12) HR (C.I.s -.21-.54, -.46-.15).

Effect of affect on attitudes, within groups. To determine whether affect was a significant predictor of attitudes for DV PSAs, separate simultaneous regressions were run, each regressing attitudes (call, donate, volunteer) for the DV PSA type (bruised face, smiling face, bruised body) on EMG, EDR, and heart rate responses for the specific image type (Section 3). None of the regressions were significant nor were any of the betas significant in any of the models: p values: .09-.99 ($p = .09$ was for smiling face *call*).

Individual Differences

Individual differences (interpersonal trauma history, PTSD symptoms) were examined as potential moderators in the relationship between DV PSA image type and outcomes (memory, attitudes).

Forty-six percent ($N = 32$) of participants completing the THQ reported a history of interpersonal trauma. Out of 68 participants completing the trauma history questionnaire, all but three participants endorsed at least one item on the THQ. Items 1-4 and 18-23 were used to obtain a cumulative score for number of interpersonal events. Four extreme outliers were Winsorized to 2.5 SD above the mean, bringing skew and kurtosis to within acceptable limits. Modification of outliers did not change the pattern of results. Results with outliers modified are reported here: $N = 68$; *Range* 0-19; $M = 2.44$ ($SD = 4.87$). Seven persons did not complete the PTSD symptom measure. As a result 61 participants were included in the PTSD symptom analysis ($M = 8.07$, $SD = 9.63$, range 0-42).

Cumulative interpersonal trauma, within group memory. For memory scores for the within condition a mixed within/between ANOVA (DV PSA image type, repeated measures factor; cumulative interpersonal trauma history, between factor) indicated there was a main effect of DV PSA image type on memory [$F(2, 118) = 5.07, p = .008$]. There was no main effect of cumulative interpersonal trauma history on memory [$F(8, 59) = .277, p = .971$]. The interaction between DV PSA image type and cumulative interpersonal trauma history although not significant, was trending [$F(16, 118) = 1.63, p = .07$]. Cohen's value indicated a large effect size for the interaction $d = .94$. Follow up comparisons of the conditional effect of exposure condition (bruised face and smiling face, bruised body and smiling face) on memory (PROCESS, Hayes, 2012) at values of interpersonal trauma indicated those lower in interpersonal trauma had better memory for text accompanying bruised faces and bruised bodies than those high in interpersonal trauma. Those high in interpersonal trauma had better memory for text accompanying smiling faces than those low in interpersonal trauma.

Between groups memory. For memory scores for the *between* condition, an SPSS macro was used to test moderation (PROCESS, Hayes, 2012). The macro conducts moderation analysis (specified as 'Model 1') using an ordinary least squares-based path analytical framework for estimating direct and indirect interaction effects. Variables were mean centered by the macro prior to analysis. "Condition" was dummy coded by the macro with bruised face as the reference category. For quantitative moderators the macro generates percentile values for comparison. Two models were run, one with each of the Condition dummy variables first as the IV and then as the covariate. Cumulative

interpersonal trauma (sum for number of times interpersonal trauma occurred¹¹) did not moderate the relationship between DV PSA image type and memory for the DV PSAs. The coefficients for the interaction terms between interpersonal trauma and condition in the two models were not significant: p values .68 and .95.

Attitudes. Attitudes were also examined as outcome. A series of mixed *within/between* ANOVAs (call, donate, volunteer ratings for DV PSA image type, repeated measures factor; cumulative interpersonal trauma history, *between* factor) indicated there were no main effects of DV PSA image type or trauma history on *calling* and the interaction between DV PSA image type and trauma history was not significant (p values .70-.96). The same was true for *donating* (p values .23-.92) and *volunteering* (p values .60-.71).

PTSD symptoms, within groups memory. For memory scores for *within* condition another mixed *within/between* ANOVA was run with PTSD symptoms replacing trauma history in the model. There was a main effect for DV PSA image type [$F(1,38) = 8.8, p = .005$], but not for PTSD symptoms [$F(2,38) = .375, p = .991$]. The interaction was not significant [$F(2,38) = .954, p = .569$].

Between groups memory. Using the same macro mentioned in the preceding trauma history section (PROCESS, Hayes, 2012), two additional models were run to examine PTSD symptoms as a potential moderator in the relationship between Condition and *between* groups memory scores. PTSD symptoms did not moderate the relationship

¹¹ Initially, analysis included interpersonal trauma history yes or no. Cumulative interpersonal trauma was examined in order to reflect the literature suggesting cumulative interpersonal trauma exposure may play a larger role in outcomes (e.g., Mullett-Hume, Anshel, Guevara, & Cloitre, 2010).

between DV PSA image type and memory for the DV PSAs. The coefficients for the interaction terms for posttraumatic distress scores and condition in the two models were not significant: p values .48 and .56.¹²

Attitudes. Attitudes were also examined as outcome. Another series of mixed *within/between* ANOVAs (call, donate, volunteer ratings for DV PSA image type, repeated measures factor; PTSD symptoms, *between* factor) indicated there were no main effects of DV PSA image type or PTSD symptoms on *calling* and the interaction between DV PSA image type and PTSD symptoms was not significant (p values .29-.98). The same was true for *donating* (p values .16-.59) and *volunteering* (p values .25-.71).¹³

Discussion

Study 1 results suggest that various types of images can result in differences in memory for accompanying text, attitudes and psychophysiological reactions (affective responses) for ads. No evidence was found for affect mediating the relationship between DV PSA image type and outcomes. Individual differences did not moderate the relationship between DV PSA image type and outcomes. However, there was a trend suggesting trauma history may influence how PSAs are processed and should be investigated further.

¹² In models using interpersonal trauma history and PTSD symptoms as moderators there was also no main effect for trauma variables on memory outcome.

¹³ Exploratory analyses were conducted to determine if cumulative interpersonal trauma or PTSD symptoms predicted psychophysiology responses to the DV PSAs. EMG, EDR, HR were regressed separately on both trauma variables. None of the models were significant (p values .113-.912).

Memory for *text* accompanying DV, smoking, and neutral PSAs was significantly different. Memory for text associated with the two types of smoking ads was not significantly different from each other, nor was memory for text associated with the two types of neutral ads. Memory for text accompanying the bruised face DV PSAs was significantly different from landscape PSAs, but not from other non-DV ads. Memory for *text* accompanying the bruised body DV PSAs differed significantly from both types of smoking ads, but did not differ from either of the neutral ads. This study measured memory for *text* in PSAs. It may be that less engaging images (landscapes, fruit, bruised bodies which can seem abstract) serve to enhance memory because these images are less likely to capture attention compared to more provocative images. However, caution must be used in comparing subcategories of PSAs (e.g., landscape ads with domestic violence ads) because not only images, but also content in the form of accompanying text differs.

Among the DV ads, memory for *text* was best in the bruised body ads, in both the within and between memory groups. This may be attributable to the less distracting quality of these images compared to faces, which are expected to capture attention. In comparing faces, memory for the bruised face ads was better than smiling face ads (*within* condition, same pattern not found in the between condition). The congruous nature of the text and bruised body and face images may have facilitated text processing, whereas the incongruous nature of the smiling face accompanying the text may have interfered with depth of processing of the ad text.

Rank preferences indicated participants preferred to *call* the DV PSAs with images of bruised faces most often, and those with smiling face images least often. Smiling face DV PSAs were also ranked last in *donate* preference most frequently,

whereas bruised body DV PSAs were ranked first or second over eighty percent of the time. This suggests a preference for bruised face and bruised body DV PSAs in attitudes towards engaging with agencies compared to the smiling face (incongruous) DV PSAs.

Affective responses differed by DV PSA types. Heart rate differing significantly (*within* and *between* conditions) for bruised face and smiling face DV PSAs, with a decrease in heart rate in response to bruised face ads and an increase for smiling face ads. This is consistent with interpretations in the literature suggesting a reduction in heart rate is associated with withdrawal motivation and an increase associated with approach. This may at first seem difficult to reconcile in light of results indicating DV PSAs associated with the greatest *decrease* in heart rate (bruised face) resulted in greater engagement with agencies than those with the greatest increase in heart rate (smiling faces). However, this may be explained by considering the possibility that ads that evoke strong emotions may compel the viewer to act in an attempt to regulate emotion.

In summary, bruised bodies and bruised faces appear to result in better memory for accompanying *text* and more favorable attitudes towards engaging with agencies associated with the image than smiling faces. The role of affect remains unclear. Although results for individual differences were not significant, the trend and large effect size indicated those with more interpersonal trauma had less memory for text accompanying bruised faces and better memory for text associated with smiling faces, compared to those low in interpersonal trauma (within condition). It is not clear if this effect is unique to memory for the *text* only, the only memory measure in this study, or if it can be generalized to the global ad. It is possible that memory for text may differ from memory for the global ad because images capture more attention than text, and are less

effortful, and are therefore more likely to be remembered. The potential role of individual differences in influencing memory for the global ad was explored further in the following studies (Studies 2 and 3).

Limitations of Study 1 include: 1) the lack of naturalistic setting, 2) only one memory measure focusing on text not the global ad, 3) only one attitude measure, 4) no self-report measure for dimensions of affect, and 5) no measure tapping dating or domestic violence (only interpersonal trauma). These limitations were addressed in Studies 2 and 3. In addition, bruised faces and smiling face images are used more often in DV PSA campaigns than bruised body images, and bruised body images confound two factors (face vs. no face, and bruised vs. no bruise), so to more clearly define the role of affect Studies 2 and 3 focused on understanding more about the two types of face images in DV PSAs.

Study 2: Introduction

This study attempted to replicate and extend results from Study 1 and to further understand undergraduate responses to domestic violence PSAs. Study 2 incorporated more extensive memory and different attitude measures, and included exposure to the ads in a naturalistic setting (university classrooms). Following exposure, students' willingness to volunteer with a campus-based domestic violence organization was measured. In addition, students had the opportunity to participate in an online survey to assess memory for the ads (free recall, cued recall, recognition), additional attitudes about involvement with domestic violence issues (response to domestic violence vignettes), effectiveness of various types of DV PSAs (persuasion ratings), affective responses, and recent history of dating violence. Bruised face PSAs resulted in better memory, higher persuasion ratings, and were associated with more engagement with the campus-based organization than smiling face PSAs. Affect partially mediated the relationship between domestic violence PSA type and memory. Individual differences did not function as moderators in the relationship between DV PSA image and memory or attitudes.

Study 2 Hypotheses

Domestic Violence Ads, Memory, Attitudes. Hypothesis 1: *Memory and attitude outcomes will differ depending on image type.*

Study 1 results indicated images can influence memory for ad text and attitudes about engaging with an associated agency. Compared to the smiling face, the bruised face

resulted in better memory for accompanying ad text. Participants also indicated a (rank) preference for *calling* agencies associated with bruised face over smiling face DV PSAs.

Study 2 predicts replication of this same pattern of findings utilizing a variety of memory measures (this time measuring memory for the global ad, not merely accompanying text) and additional attitude measures in a larger sample of undergraduates. In addition to comparing domestic violence PSAs to one another (bruised faces, smiling faces) a no-PSA control condition has been added. The no PSA condition is expected to result in less engagement with the campus-based domestic violence agency compared to both type of DV PSAs.

Dimensions of Affect. Hypothesis 2: *Affective responses will mediate the relationship between ads and memory and attitude outcomes.* Although affect, using psychophysiology measures, did not mediate the relationship between DV PSA image type and memory or attitude outcomes in Study 1, Study 2 will utilize self report affect measures to examine the possibility of affect as mediator.

Individual Differences. Hypothesis 3: *Individual differences will moderate the relationship between types of DV PSAs and memory and attitude outcomes.* In Study 1 there was a trend indicating those with more interpersonal trauma had less memory for bruised faces and better memory for smiling faces, compared to those low in interpersonal trauma. Study 2 will utilize a dating/domestic violence specific measure to examine the possibility of trauma history as moderator further, including examining separate variables for psychological aggression and physical aggression in dating relationships.

Although PTSD symptoms did not moderate the relationship between DV PSA image type and outcomes in Study 1, Study 2 will examine the possibility of PTSD symptoms as moderator in this larger sample of undergraduates.

Method

Participants

Undergraduates were recruited from seven introductory psychology classes over the course of three quarters (2010-2011). A total of 413 students completed in-class volunteer response sheets. A total of 263 (183 female 70%, 79 male 30%, 1 transgender <1%) students completed the follow-up online survey. Most participants reported being White/Euro-American (73%), followed by Asian (9%), Hispanic/Latino (6%), Bi/multi-ethnic (6%), Black/African American (3%), Native American (1%), and “Other” (2%).

Stimulus Materials

DV PSAs used for Study 2 were the same as those used in Study 1, with one exception: the African American images were not used for the classroom exposure due to the low number of African Americans represented at the university where the study took place (3%). For the 56 x 42 inches posters displayed in classrooms, and for the online follow up survey, bruised face and smiling face image DV PSAs were used, different images within the subcategory for each quarter. Ad text was modified slightly to be more relevant to a university undergraduate population – for example, “I won’t finish my degree” with related statistic: *Between 20-50% of college students have experienced dating violence*. The phone numbers were real numbers for both an on-campus and

national resource line, and were displayed below the text, “*If you or someone you know needs help*” along with the organization’s name. There was also a logo in the bottom right corner for the on-campus student group, R.A.G.E. (details on R.A.G.E. in following section).

Procedure

Classroom component. One of two types of domestic violence posters (bruised face or smiling face image; or a no poster control condition) were hung in introductory psychology classrooms mid quarter. The posters were placed by research assistants and members of the campus group R.A.G.E. The posters were only up during the specific psychology section, and were removed after 3 consecutive classes. No announcement regarding the poster was made to the class; they were simply present in the room when students were attending the class. On the 4th class after removal, an undergraduate research assistant and the principal investigator visited the class and recruited for an on campus student domestic violence awareness organization (R.A.G.E.) at which point they handed out volunteer forms (see measures for details). Students were asked to complete the forms indicating a range of volunteer options, including the option not to volunteer. This information was passed on to R.A.G.E., and a representative from R.A.G.E actually contacted those who expressed an interest in volunteering.¹⁴

¹⁴ Rape Awareness and Gender Education (R.A.G.E) is a student group at the University of Denver which aims to educate the DU community about sexual assault and rape, including domestic violence (http://www.du.edu/studentlife/Sexual_Assault/RAGE.html). R.A.G.E. is always looking for volunteers to assist with events. This study was discussed in advance with the R.A.G.E. coordinator.

At that point, students were asked if the volunteering information could also be used as part of a study. They could indicate in a box at the bottom of the volunteer form whether they agreed that R.A.G.E could share the information with the research group. They were also invited to participate in an on-line study for extra credit within the next week. To do so they were instructed to take the card stapled to the top of the volunteer sheet and follow the instructions on the card. The sheet was collected by the undergraduate research assistant. The card was kept by the students.

Online component. The students who chose to take the online survey first completed informed consent online, then a series of memory and attitude measures, affect ratings for various ads, and individual difference measures (history of dating violence, PTSD symptoms), after which they read an online debriefing statement. Students in the no ad classroom control condition completed all online measures that were not based on exposure. For example, they did not complete the section on memory for classroom PSAs, but they did complete sections on persuasion ratings for various PSAs viewed online.

Section 1. After reading a consent form similar to that provided during Study 1 participants were asked to read and respond to three campus-based domestic/dating violence vignettes. These vignettes were designed to determine whether participants would be likely to call a hotline or contact an agency if a fellow student on campus were in an abusive situation. Vignettes also tapped memory for hotline numbers and agency names (see measures for details). This measure was administered first so differences were not confounded by ads shown in the later sections of the online survey.

Section 2. Participants were then given an opportunity to indicate whether they recalled seeing any PSA displays in their classroom, and if so, to type in any ad content they could remember. Participants were then told that there was a domestic/dating violence PSA in the classroom over the course of three classes and were asked if they could recall anything additional. Following this participants were asked a series of 6 true/false questions about content in the actual ad that was displayed in their classroom. Finally, participants were shown 6 domestic violence PSAs on the computer and were asked to rate whether each ad was seen previously on a 6 point scale (1 = certainly hadn't seen it in my classroom to 6 = certainly had seen it in my classroom). These were similar domestic violence PSAs as those shown in Study 1, only one of which was the actual PSA displayed in their classroom.

Section 3. In the next section students completed additional attitude measures and affect ratings. Participants were shown the same two domestic violence PSAs (one bruised face ad, one smiling face ad) that were displayed in the classrooms. Arousal, valence, and motivation ratings were obtained for each ad. Participants were also asked to rate how persuasive they found each ad.

Section 4. In this last section participants completed two questionnaires, one to assess exposure to dating violence in the last 24 months and the other to assess PTSD symptoms. Finally, participants read an online debriefing form and were given additional accurate domestic violence information for local and online resources.

Measures

Free recall. Participants were given an opportunity to recall the content of the ad they saw in their classroom and write down words or phrases they remembered. These procedures are similar to those others have used (e.g., Bagozzi & Moore, 1994; Hamann, Ely, Grafton, & Kilts, 1999). Scores were rated on a scale from 0-1 (0, .5, 1) based on how much detail the participant remembered about the DV PSA in the room. A '0' scored was assigned to responses such as, 'I don't remember,' 'some poster,' or a blank. A .5 was assigned to responses such as, 'black and white poster with a female picture,' 'there was a woman's face,' 'about domestic violence,' 'something about not finishing a degree.' A 1 was assigned to responses such as, 'girl with a black eye, about domestic violence, mentioned decline in graduation rate,' 'there is a girl's face, she has been beaten and then it says something about domestic violence and then R.A.G.E.,' 'I remember seeing an image of a woman with short hair and a 1 800 number to call and a website,' 'a girl with a black eye, help someone being abused, a number to call.' Two raters determined level of detail in written responses as has been done elsewhere (e.g., Hamann, Ely, Grafton, & Kilts, 1999). All free recall responses were scored independently by two persons, inter-rater agreement was 97% (254 out of 263 responses).

Cued recall. Participants answered a series of 6 true/ false questions about content in the previously viewed domestic violence ad. This measure was similar to those used previously to examine memory for facts contained in print ads (e.g., Leigh, Zinkhan, & Swaminathan, 2006; Lescher & Chang, 2009). Questions focused on the quote, statistics in the ad, hotline number, and agency name. Scores were rated on a scale from

0-6 (1 point for each correct response for a total of 6 questions) and are reported as a percentage of correct responses.

Recognition. Participants were shown domestic violence PSAs and asked to rate whether an ad was seen previously on a 6 point scale (certainly hadn't seen it; probably hadn't seen it; more probably hadn't than had; more probably had than hadn't; probably had; certainly had). The score for the actual DV PSA viewed previously was utilized as the total. This type of measure, and other similar measures, have been used by others to assess recognition memory for images (e.g., Amir, Leiner, & Bomyea, 2010; Fernandez-Rey & Redondo, 2007).

Volunteer with campus organization. This measure was designed to determine the extent of participant interest in engagement in domestic violence initiatives. Participants were given a choice to provide contact information and permission for a R.A.G.E representative to contact them. They were asked if they would like 1) general information; 2) updates on specific campus events; 3) to volunteer to help with a one-time event; or 4) to become a member and participate fully in the organization.

Responses to campus-based vignettes. Participants were asked to respond to several questions associated with 3 on-campus domestic violence scenarios. The questions have been taken from previous research (Behavior Research Center, 2005), slightly modified. Following the global question, 'what would you do?' participants were given a series of choices including: 'call a hotline or provide a hotline number,' 'contact or share information about a domestic violence organization or shelter,' 'contact a family member, friend, or other trusted advisor,' and the like. If participants indicated that they would call a hotline or contact an agency, they were asked if they could recall any

specific hotline number or agency name. The scenarios were from the University of Arizona C.A.T.S. Life Skills Program, adapted from The University at Albany Counseling Center: http://www.stepupprogram.org/topics/relationship_abuse/#scenario. These were all geared towards university students and involved events at a campus party and in the dorms (see Appendix 1). Memory for phone number and organization name were coded (0, 1); categorical responses were coded (0,1) for each type of involvement response (e.g., contact a friend).

Affect Ratings - SAM Manikin. During the online survey the same two domestic violence PSAs as displayed in the classrooms were shown (one bruised face ad, one smiling face ad). Arousal, valence, and motivation ratings were obtained for each full ad. Consistent with previous research, including research on advertisements (see Morris, 1995 for a review), the SAM Manikin (Lang, 1985) was used for arousal and valence ratings (1-5 point scales). A modified version of SAM was used for motivation ratings (1-6 point scale to represent 3 approach and 3 withdrawal images). SAM depicts each dimension with a graphic character arrayed along a continuous scale. For valence SAM ranges from a smiling happy figure to a frowning unhappy figure. For arousal SAM ranges from sleepy with eyes closed to excited with eyes open. For motivation, a figure facing forward gets larger upon approach or smaller with back to the viewer while moving away (withdrawal). Participants were told they should provide ratings for the complete ad (not merely the image in the ad).

Persuasion ratings. A measure of persuasion used previously in anti-smoking PSAs (Rhodes, Roskos-Ewoldsen, Edison, & Bradford, 2008) was adapted for use with DV PSAs. Participants were shown two domestic violence PSAs (one bruised face ad,

one smiling face ad) and were asked to rate the following on a 7 point scale: “I thought the ad was persuasive;” “I thought the ad was convincing;” “I think women experiencing intimate partner violence would be persuaded by this message;” “I think women experiencing intimate partner violence would find this ad convincing.” These items were averaged to form a composite of ‘perceived convincingness’ as has been done previously; this 4 item measure has demonstrated satisfactory psychometric properties (Rhodes, Roskos-Ewoldsen, Edison, & Bradford, 2008).

Conflict Tactics Scale 2 (CTS; Straus et al., 1996). The CTS-2 is a self-report measure which addresses the frequency and severity of various conflict resolution behaviors used in relationships. The CTS-2 is an instrument which has been widely used in research on domestic and dating violence. In the current study, the CTS-2 was used to assess exposure to dating violence in the last 24 months. The total number of psychologically aggressive tactics from a dating partner in the last 24 months (including a sexual coercion item, possible range 1-16) was tallied. This is supported by previous research recommending measures of violence use sums of total numbers of acts endorsed to capture severity (e.g., Regan, Bartholomew, Kwong, Trinke, & Henderson, 2006). We used the physical aggression subscale (plus one sexual assault item, possible range, 0-14) and omitted the injury subscale due to time constraints. The injury subscale has previously been shown to be highly correlated with the physical aggression subscale (Regan et al., 2006). Cronbach’s α was good for the psychological aggression subscale = .82 and for the physical aggression subscale = .78.

Posttraumatic Diagnostic Scale. This is the same measure used in Study 1, scored in the same manner. For the current study Cronbach’s α was excellent = .92.

Results

Prior to analysis, variables of interest were examined for violations of statistical assumptions in the same manner as for Study 1. See participant section for description of sample demographic characteristics. A total of 413 participants returned volunteer forms in class (7 classes, all quarters), of these 263 participants (64%) completed the online portion of the study (Fall: $n = 80$; Winter $n = 134$; Spring: $n = 49$).

Due to experimenter error, one class section experienced a dual exposure in the classroom, seeing both a smiling face and bruised face poster.¹⁵ Participants in this dual exposure section and the other section for the same quarter¹⁶ have been excluded from analyses related to classroom exposure (e.g., memory for posters; volunteer responses), but are included for online components not associated with exposure condition (e.g., persuasion ratings for ads viewed online). In addition, the no exposure control condition participants did not complete the online memory tests. As a result, participant totals vary by analyses: for memory analysis $N = 165$ (bruised face $n = 98$; smiling face $n = 67$); vignette responses $N = 214$; for persuasion ratings $N = 263$; volunteer responses $N = 299$.

Memory

Although in the following section data across quarters has been combined, initially data was analyzed by quarter. Across quarters, using different images within the

¹⁵ On one day, the bruised face posters were mistakenly not taken down after class; the next day the smiling posters were put up in the same classroom for the other section, resulting in that section seeing both posters during one class period.

¹⁶ Methods for distribution and collection of volunteer forms differed slightly Spring quarter, based on instructor request (i.e., one instructor asked that the researcher visit class during the last few minutes so as not to cut into class time. As a result not all students stayed to receive volunteer forms). Methods were matched for both classes, but differed from other quarters. In addition, anti-domestic violence campaigns

subcategory (e.g., bruised face DV PSAs with images of woman with dark hair or light hair) patterns were consistent, with effects in the same direction.

Free recall. Fall and Winter quarter responses were combined. An independent samples *t* test indicated participants exposed to the bruised face DV PSAs had significantly higher memory scores ($M = .70$, $SD = .41$) than did those exposed to the smiling face DV PSA ($M = .38$, $SD = .41$), $t(164) = 4.89$, $p < .001$. Cohen's effect size value indicated a moderate to large effect size, $d = .78$.

Cued recall. An independent samples *t* test indicated participants exposed to the bruised face DV PSAs had significantly higher cued recall memory scores ($M = 5.22$, $SD = .89$) than did those exposed to the smiling face DV PSA ($M = 4.30$, $SD = 1.23$), $t(162) = 5.57$, $p < .001$. Cohen's effect size value indicated a large effect size, $d = .88$.

Recognition memory. An independent samples *t* test indicated participants exposed to the bruised face DV PSAs were significantly more confident in remembering seeing the poster displayed in their classroom ($M = 5.14$, $SD = 1.46$) than those exposed to the smiling face DV PSA ($M = 3.96$, $SD = 2.0$), $t(205) = 4.99$, $p < .001$. Cohen's effect size value indicated a moderate to large effect size, $d = .79$.

Attitudes

Persuasion Ratings. Participants viewed online the DV PSAs with bruised and smiling faces. A paired sample *t* test indicated the bruised face PSAs ($M = 21.59$, $SD = 5.38$) were considered to be significantly more persuasive than the smiling face PSA (M

were happening on campus Spring quarter so using memory data from the non dual exposure condition (bruised face) seemed problematic without a matched condition from the same quarter.

= 8.71, $SD = 5.18$), $t(256) = 27.18$, $p < .001$. Cohen's effect size value indicated a large effect size, $d = 1.7$.

Responses to campus-based vignettes. Vignettes were examined to determine if participants recalled the hotline numbers or agency names displayed on the posters. Overall, when asked if the student knew of any hotline number to call only 7 (3%) answered yes. When asked if they knew an agency to contact 138 (68%) students answered yes. Only 17 (8%) students attempted to recall a hotline number or agency from the posters displayed in class. These participants provided hotline numbers and agency names that did not match what was on the poster, with the exception of one participant who mentioned the name of one of the agencies (R.A.G.E.). All vignette variables were summed across the three vignettes. The percentage of total participants indicating they would take each action are provided in Table 6.¹⁷ Chi square analyses found no differences in responses by condition.

Volunteer forms. All students were asked to return volunteer forms at the end of class even if they had no interest in obtaining additional information or volunteering. Fall and Winter data were combined in order to compare bruised and smiling face exposure conditions across quarters ($N = 299$).¹⁸

A chi square test was performed to examine whether the bruised face and smiling face conditions resulted in equal interest in engaging with R.A.G.E. Those in the bruised

¹⁷ A few participants provided a description of *other* actions they would take (not mentioned in in Table 6). Using a bottom up coding strategy (constant comparative method; Glaser 1965; Lincoln and Guba 1985) the following were the most common: *talk to him/her or both of them about the situation; physically pull her away/protect her; tell her to break up with him; call police or campus security.*

¹⁸ Spring data were excluded for both conditions for reasons explained previously.

face exposure condition were significantly more likely to indicate an interest in finding about more about R.A.G.E. than those in the smiling face condition, $X^2 = (1, N = 238) = 8.71, p < .01$. Cohen's effect size value indicated a small to moderate effect size, $d = .38$.

Chi square tests at the subcategory level (general information, updates on specific campus events, interest in volunteering, becoming a member) indicated no differences among those interested in getting more information in particular interest in updates about specific campus events, interest in volunteering, or becoming a full member of R.A.G.E. between conditions. However, there were significant differences in interest in general information, $X^2 = (1, N = 206) = 6.43, p < .05$, with significantly more interest from the bruised face exposure group. Cohen's effect size value indicated a small to moderate effect size, $d = .36$.

The bruised face condition was subsequently compared to the no exposure control condition. There were no significant differences between groups.

Affect

Affect Ratings. Participants who took part in the online session were asked to rate DV PSAs (bruised face, smiling face) on valence, arousal, and motivation (approach/avoid) using the SAM manikin. A series of paired t tests for data from all quarters collapsed ($N = 254$) rated the bruised face DV PSAs as significantly more negative in *valence* ($M = 3.72, SD = 1.19$) than the smiling face DV PSAs ($M = 3.10, SD = 1.12$), $t(253) = 5.37, p < .001$. There was no significant difference in *arousal* for the bruised face DV PSA ($M = 2.92, SD = 1.27$) compared to the smiling face DV PSA ($M = 2.89, SD = 1.30$), $t(253) = .058, p = .954$. Regarding motivation, the bruised face DV

PSA resulted in significantly higher withdrawal scores ($M = 3.62$, $SD = 1.59$) compared to the smiling face DV PSA ($M = 3.16$, $SD = 1.39$), $t(253) = 3.27$, $p = .001$.

Effect of affect on memory. Analyses on the role of affect on memory utilize data from Fall and Winter only due to exclusion of Spring data from memory analyses based on dual exposure). As in Study 1, an SPSS macro was used to test whether affect mediated the relationship between DV PSA exposure condition (bruised face, smiling face) and outcomes (memory, attitudes) (MEDIATE; Hayes & Preacher, 2011), see Table 7 for all mediation results, including indirect effects.

Free recall. Affect did not mediate the relationship between DV PSA image type (condition) and free recall memory for DV PSAs.

Cued recall. Valence partially mediated the effects of poster exposure condition on cued recall (see details in Table 7). Bruised face DV PSAs resulted in greater negative valence which in part explains greater cued recall memory for DV PSAs (bruised face negative valence $M = 3.70$, $SD = 1.13$); smiling face negative valence $M = 3.14$, $SD = 1.25$). Arousal partially mediated the effects of poster exposure condition on cued recall (see Table 7). Bruised face DV PSAs resulted in greater arousal (bruised face arousal $M = 3.01$, $SD = 1.27$); smiling face arousal ($M = 2.04$, $SD = 1.25$), which in part explains greater cued recall memory for DV PSAs. Motivation did not mediate the effects of poster exposure condition on cued recall (see Table 7).

Recognition. Neither valence nor motivation mediated the relationship between DV PSA image type (condition) and *recognition*. Arousal *partially* mediated the effects of poster exposure condition on *recognition*. Bruised face DV PSAs resulted in greater

arousal (bruised face negative arousal $M = 3.01$, $SD = 1.27$); smiling face arousal $M = 2.04$, $SD = 1.25$) which in part explains greater recognition memory for DV PSAs.

Attitudes. To determine if affect predicted *persuasion*, persuasion scores for bruised face and smiling face DV PSAs were separately regressed onto valence, arousal, and motivation ratings (for those specific DV ads). Because these images were viewed and rated online, online data from all quarters was used in the analyses. The model was not significant for bruised face DV PSAs [$F(3, 252) = 1.09$; $p = .355$, $R^2 = .01$] nor for smiling face DV PSAs [$F(3, 251) = 1.20$; $p = .115$, $R^2 = .02$].

Individual Differences

To determine if individual differences moderated the relationship between DV PSA condition and outcomes (memory, attitudes) an SPSS macro (PROCESS, Hayes, 2012) was used to test moderation. The macro conducts moderation analysis (specified as ‘Model 1’) using an ordinary least squares-based path analytical framework for estimating direct and indirect interaction effects. Variables were mean centered by the macro prior to analysis. “Condition” was dummy coded by the macro with bruised face as the reference category. For quantitative moderators the macro generates percentile values for comparison.

Domestic Violence history. Psychological aggression and physical aggression were examined separately as potential moderators of DV PSA condition on all memory variables (free recall, cued recall, recognition; Fall and Winter only) and persuasion ratings (all quarters).

Neither psychological aggression nor physical aggression moderated the relationship between DV PSA condition and free recall, cued recall, or recognition memory. The coefficients for the interaction terms were not significant: psychological aggression x condition, physical aggression x condition: free recall: p values .37 and .28; cued recall: $p = .38$ and .69; recognition: $p = .53$ and .11.

PTSD symptoms. PTSD symptoms were examined as a potential moderator of DV PSA condition on all memory variables (free recall, cued recall, recognition; Fall and Winter only). PTSD symptoms did not moderate the relationship between condition and free recall, cued recall, or recognition memory. The coefficients for the interaction terms were not significant, p values .50-.62.

To determine if dating violence (psychological aggression, physical aggression) and PTSD symptoms predicted *persuasion*, persuasion scores for bruised face and smiling face DV PSAs were separately regressed onto all individual difference variables. The model was not significant for bruised face DV PSAs [$F(3, 128) = .927; p = .43, R^2 = .02$] nor for smiling face DV PSAs [$F(3, 127) = .620; p = .60, R^2 = .01$].

Discussion

As expected based on findings in Study 1, the bruised face DV PSA resulted in significantly better memory (free recall, cued recall, and recognition), for the global content of the ad than the smiling face DV PSAs. These results expanded on Study 1 results indicating this finding is robust across different types of memory measures. In addition, while Study 1 focused on memory for *text* accompanying the image, Study 2 measured memory for the global ad (text and image) and found similar results, indicating

the memory effect is not specific to text. Utilizing a bruised face image appears to be a more successful strategy for promoting encoding of ad content than a smiling face image. Bruised face DV PSAs were also rated as significantly more persuasive and resulted in significantly greater interest in engaging with the on-campus student organization R.A.G.E. when compared to the smiling face DV PSA.

There were no differences by condition in responses to the vignettes for bruised face, smiling face, and the no poster control condition. This suggests bystander responses to actual incidents may not be open to influence by a brief PSA campaign. Surprisingly, no students were able to recall the hotline number or agency (with one exception) listed on either the bruised or smiling face posters. The hotline and agency name were approximately the same size and in the same location on the posters as is common for most DV PSAs. If this is one of the primary goals of a given DV PSA campaign it is worth considering alternative strategies to promote memory for these items, especially when faced with an actual opportunity for intervention in response to observed dating/domestic violence. It may also signal that such campaigns do not change this type of behavior in small doses, suggesting more sustained advertising may be necessary.

Affect ratings differed for bruised and smiling face DV PSAs. Bruised face PSAs were rated as significantly more negative in valence, and higher in withdrawal motivation than were smiling face PSAs. When affect was examined as a mediator in the relationship between DV PSA exposure condition and memory outcomes for the subgroup of Fall and Winter participants, there were main effects of DV PSA condition on valence and arousal, with bruised faces PSAs resulting in greater negative valence and more arousal, both of which partially mediated memory outcomes. Specifically, bruised face images

were more arousing and were rated higher in negative valence, contributing to better memory outcomes for the bruised compared to smiling face PSAs. This suggests specific dimensions of affect may be driving outcomes, and underscores the importance of examining these dimensions of affect separately in an attempt to better understand mechanisms of influence for DV PSAs on outcomes. This was examined further in Study 3.

There was no evidence that a history of dating violence (psychological or physical aggression) or PTSD symptoms influenced how well participants remembered or how persuasive they found the ads. However, it is not clear whether individual differences may play a role in samples with greater exposure to domestic violence and higher PTSD symptoms. Study 3 considered the same individual differences (history of domestic violence, PTSD symptoms) in just such a sample.

Limitations of this study include that there was no measure for affect while viewing DV PSAs in the classroom. Affect was measured post-hoc online in response to reviewing the same ads seen in the classroom. This may not be the ideal indicator for measuring affective responses. In Study 3 a measure of mood state during passive viewing (i.e., when the viewer's attention is not called to the ad) was included to address this concern.

Study 3: Introduction

Study 3 attempted to replicate and expand findings from Studies 1 and 2 in a non-university low-income diverse community sample of women with a history of domestic violence. Consistent with measures used in Studies 1 and 2, various types of memory (free recall, cued recall, recognition), attitudes about ads (intent to call, donate to, or volunteer with a particular agency; persuasion ratings), were measured following exposure to DV PSAs. In addition, a measure of mood state during poster exposure was included. Similar to Studies 1 and 2, this study considered whether affective responses and individual differences (recent domestic violence, PTSD symptoms) play a role in responses to DV PSAs. Results indicated bruised face DV PSAs were associated with more favorable attitudes and were more persuasive compared with smiling faces. Affective responses also differed for the ads and predicted volunteer ratings and persuasion scores. Those with higher PTSD reported the greatest interest in calling the smiling face ad. There was a trend such that higher levels of PTSD were associated with better recognition memory for bruised and worse memory for smiling face ads; this merits further exploration.

Study 3 Hypotheses

Domestic Violence Ads, Memory, Attitudes. Hypothesis 1: *Memory and attitude outcomes will differ based on DV PSA image type.* It is expected that finding from Studies 1 and 2 will be replicated in this community sample. DV PSAs will be compared to one another (smiling faces, bruised faces) with the expectation that bruised

face DV PSAs will result in better memory (free recall; cued recall; recognition), and more favorable attitude outcomes (self-reported intent to call, donate or volunteer; persuasion ratings) than smiling face DV PSAs.

Dimensions of Affect. Hypothesis 2. *Affective responses will mediate the relationship between ads and memory and attitude outcomes.* It is unclear based on results from Study 1 and 2 whether, or to what extent, affect plays a mediating role in the relationship between ad type and outcomes. This will be explored further in this community sample in hopes of clarifying equivocal results from Study 1 and 2.

Individual Differences. Hypothesis 3: *Individual differences will moderate the relationship between DV PSAs and memory and attitude outcomes.* Although there were no significant differences in response to DV PSAs based on trauma history in Study 1 or 2, Study 3 involves a diverse community sample of recent survivors of domestic violence so results may differ. Although there were no significant differences in response to DV PSAs based on PTSD symptoms in Study 1 or 2, because of the unique nature of the sample Study 3 will examine the potential moderating role of PTSD in the relationship between DV PSAs and outcomes.

Method

Participants

Study 3 collected data from 57 women participating in Time 4 of the Denver Triage Project (P.I.: Dr. Anne DePrince), a NIH-funded longitudinal evaluation of a community-based victim outreach program for improving criminal justice outcomes among victims of domestic violence. The Denver Triage Project enrolled 236 women

from the population of new domestic violence cases reported to the police in Denver to participate in a series of three interviews. One hundred eighty-nine women completed the Time 3 interview, during which women could provide consent to be contacted for future studies. One hundred seventy-six provided consent for future contact. Of these, 57 women (32%) completed an additional Time 4 follow-up¹⁹ (between March 2011 – March 2012), average duration between Time 3 and Time 4 assessment, $M = 25$ months. Women completing Time 4 ranged in age from 19 to 61 ($M = 36$; $SD = 11.63$). Time 4 participants identified with the following racial/ethnic groups: 46% Hispanic, 42% Caucasian, 26% African-American, 16% Native-American/Alaska Native, 0% Asian-American, 0% Native Hawaiian or other Pacific Islander, and 7% other (note: participants could indicate multiple ethnic/racial categories). The majority of women were low income (annual income $M = 17,278$; $SD=13,850$).

Stimulus Materials

The stimuli (DV and ‘distractor’ PSAs) were identical to those used for Study 1 and 2. The PSAs used for display in the waiting room were 2 ft. x 3 ft. posters: one of two types of domestic violence PSA (bruised face or smiling face, 3 of each used in random rotation including the African American images because this sample was 26% African American); one anti-smoking PSA (with a smiling face); one education PSA (with a smiling face), and one state tourism PSA (landscape image) (position of these

¹⁹ This comparatively low retention rate for Time 4 is likely due to a variety of factors, including: 1) time lapse between Time 3 and Time 4 ($M = 25$ months) making many women difficult to find (e.g., outdated contact information); 2) lower rate of financial compensation compared to previous time points; 3) funds were not available for taxis, unlike other time points (although bus fare was provided).

“distractor ads” was constant). These ‘distractor’ ads are consistent with the types of PSAs that are likely to be displayed next to domestic violence PSAs and may compete for the viewer’s attention.

Procedure

Consistent with procedures followed when the same women were interviewed in the lab previously, participants were invited by letter and phone to participate. Participants were compensated \$25 for the combination of this study and a follow up to the earlier data collection (duration of interview two hours).

Section 1. Participants completed a series of computer tasks related to the follow up study.

Section 2. Next participants were escorted into a waiting room. Participants were randomly assigned to be exposed to one of two types of DV PSA conditions (smiling face or bruised face) ($N = 56$; bruised face $n = 38$; smiling face $n = 18$ ²⁰). One woman was not able to sit in the waiting room due to health problems. On the walls of the waiting room four PSAs were displayed. Participants were not instructed to look at the posters. Each participant waited 2 minutes alone in the room with posters displayed on the wall facing the participant. Participants were told that the researcher needed to get some materials and would be right back. After 2 minutes the researcher returned and asked participants to complete a self-report measure of emotion. Participants remained in the room until

²⁰ The groups are unequal because the random assignment list generated for poster type did not account for the possibility that fewer participants would participate than anticipated.

completion (they were instructed to tell the researcher when the measure had been completed).

Section 3. Following this participants were escorted back to the room where they completed the memory tasks for this study. Participants were asked to try to recall any details associated with the DV PSAs hanging in the waiting room; next they were asked a series of true/false questions about the domestic violence PSA they saw. Finally, they were shown a series of domestic violence PSAs and asked if they recall seeing these PSAs previously (only one of the PSAs was the one from the waiting room for a given participant).

Section 4. Finally participants were shown two additional domestic violence PSAs, one with a smiling face and the other with a bruised face, and were asked to rate valence, arousal, and motivation while viewing the DV PSAs. They were also asked to rate intent to call, donate or volunteer with the agency associated with each PSA, to rank order the ads in terms of preference, and complete persuasion ratings for these ads. Upon completion of the study protocol, participants were debriefed on the purposes of the study and given domestic violence and smoking-related resource sheets. These resource materials contained accurate information about local and Internet-based resources.

Measures

Free recall. Same free recall measure used in Study 2.

Cued recall. An expanded T/F cued recall measure (10 questions) was used, similar to that used in Study 2. In Study 1 and 2 (T/F measures comprised of 6 questions), all questions were directly associated with the DV PSAs. In Study 3 of the 10

questions 8 were directly associated with the DV PSAs, 2 questions were about the smoking ad.

Recognition. Same recognition measure used in Study 2.

Intent to act (call, donate, volunteer). This is the same measure used in Study 1.

Persuasion ratings. This is the same measure used in Study 2.

Self-reported valence. Self-report negative affect was measured using the *Positive and Negative Affect Schedule – Expanded Form (PANAS –X)* (Watson & Clark, 1994). This 60 item self-report measure taps positive and negative valence as well as 11 specific affects: Fear, Sadness, Guilt, Hostility, Shyness, Fatigue, Surprise, Joviality, Self-assurance, Attentiveness, and Serenity. The 60 item measure consists of words and phrases that describe different feelings and emotions. For the purpose of this study, the participant was asked to rate each item (based on the extent to which the person felt this way currently, which was while in the waiting room with the PSAs) on a scale ranging from 1 (very slightly or not at all) to 5 (extremely). The PANAS-X has demonstrated good psychometric properties (Watson & Clark, 1994). The PANAS-X is often used as a measure of ‘state affect’ to assess relatively short-term fluctuations in mood.

Affect Ratings - SAM Manikin. This is the same measure used in Study 2.

Conflict Tactics Scale 2. This is a slightly modified version of the measure used in Study 2. In the current study, the CTS was used to assess exposure to domestic violence (since the participant’s last interview at the lab). The measure was scored in the same way as was done for Study 2 (Cronbach’s α psychological aggression subscale = .71, physical aggression subscale = .73).

Posttraumatic Diagnostic Scale. This is the same measure used in Study 1 and 2 (Cronbach's $\alpha = .91$).

Results

Prior to analysis, variables of interest were examined for violations of statistical assumptions in the same manner as for Study 1 and 2. See participant section for description of sample demographic characteristics.

Memory

DV PSAs were compared to one another (smiling faces, bruised faces) to determine which ad, if any, resulted in better memory (free recall; cued recall; recognition), and more favorable attitude outcomes (self-reported intent to call, donate or volunteer; persuasion ratings).

Free recall. The majority of participants (77%) remembered something about the DV PSA (scored 0, 1). While 80% of those exposed to the bruised face condition remembered something about the DV only 67% of those exposed to the smiling face DV PSA remembered something about the DV PSA. However, a follow up chi-square test of independence between the two groups (Fisher's exact test) was not significant, $p = .49$. The majority of participants also remembered something about the other (non DV) PSAs (84%). There were no significant differences between condition on memory for other PSAs, Fischer's exact test, $p = 1.0$

Cued recall. True/false scores on the cued recall memory test (for information associated with DV and smoking posters) ranged from 010, $M = 8.1$, $SD = 1.5$ (bruised

face DV PSA condition $M = 8.1$, $SD = 1.1$; smiling face DV PSA condition $M = 8.2$, $SD = 1.6$). An independent samples t test confirmed there was no difference in cued recall between conditions, $t(53) = .53$, $p = .96$. Because the cued recall measure in this study included two questions not related to the DV PSA, cued recall was also examined with the two smoking questions removed, range 0-8, bruised face $M = 6.3$, $SD = 1.5$, smiling face $M = 6.4$, $SD = .91$. An independent samples t test confirmed there was no difference in cued recall between conditions, $t(53) = -.45$, $p = .65$.

Recognition. Participants were also tested on recognition for the DV PSA they were exposed to in the waiting room. Participants were given a recognition score for their actual DV PSA (recall confidence score ranging from 1-6, with 1 indicating ‘certainly hadn’t seen it,’ and 6 indicating ‘certainly had seen it’), total both groups combined $M = 3.4$ ($SD = 2.3$). The participants exposed to the bruised face DV PSA appeared to be less confident ($M = 3.1$, $SD = 2.33$), than those viewing smiling face DV PSAs ($M = 4.3$, $SD = 2.16$), a follow up independent t test indicated that the difference, although trending, was not significant, $t(53) = -1.85$, $p = .07$. Cohen’s effect size value indicated a small to moderate effect size for the trend, $d = .42$.

Attitudes

Call, donate, volunteer. Participants were shown bruised face and smiling face DV PSAs and asked to rate how likely they would be to *call*, *donate to*, or *volunteer* with, the associated agency on behalf of themselves or a friend. Descriptive statistics can be found in Table 9. Paired t tests indicated participants’ preferences for calling, donating, and volunteering for the bruised faced DV PSA were significantly higher than for the

smiling face DV PSA: *call* $t(56) = -5.15, p < .001$; *donate* $t(56) = 15.00, p < .001$; *volunteer* $t(56) = -5.08, p < .001$. Cohen's effect size value²¹ indicated a moderate to large effect size for *call*, $d = .70$, *donate*, $d = .68$, and *volunteer*, $d = .69$.

To compare forced choice rank preference for engaging with a service agency by DV PSA type, a paired Wilcoxon signed rank test was used to determine if rank categories occurred with equal probabilities for the two DV PSA image types (see Table 9). Rank preference showed a significant preference for engaging with agencies associated with the bruised face (*call* DV PSA, $Z = -5.61, p < .001$; *donate* $Z = -6.80, p < .001$; *volunteer* $Z = -6.26, p < .001$). Cohen's effect size value indicated all were moderate to large effects, *call* $d = .74$, *donate* $d = .90$, *volunteer* $d = .83$.

Persuasion. Persuasion ratings were also obtained for each type of DV PSA. As has been done for previous studies, a composite persuasion score was formed from the 8 persuasion questions for the two types of DV PSA (*Cronbach's alpha* = .73). A paired t test indicated that participants found the bruised face DV PSAs significantly more persuasive, $t(55) = -11.99, p < .001$ (bruised face $M = 25.32, SD = 3.94$; smiling face $M = 11.36, SD = 7.36$). Cohen's effect size value indicated a large effect size, $d = 1.66$.

Affect

Participants provided self-reported valence, arousal, and motivation (approach/withdrawal) responses utilizing SAM Manikins. Participants rated bruised face ads as more negative in valence ($M = 4.46, SD = .63$) than the smiling face ads ($M = 2.91,$

²¹ All effect sizes for paired/within subjects data have been calculated utilizing a correction for dependence between means, Morris and DeShon's (2002) equation 8.

$SD = 1.09$), $t(56) = -10.13$, $p < .001$. They rated the smiling face ads as more arousing however ($M = 3.74$, $SD = 1.30$) than the bruised face ads ($M = 1.77$, $SD = 1.00$), $t(56) = 9.06$, $p < .001$. Cohen's effect size value indicated a large effect for this difference, $d = 1.74$. Motivation ratings (SF $M = 3.14$, $SD = 1.19$; BF $M = 3.40$, $SD = 1.61$), did not differ significantly between the two types of DV PSAs, $t(56) = -1.02$, $p = .31$.

Mood state. Participants rated positive and negative affect while in the waiting room sitting across from the various PSAs, Positive Affect Scale (N = 54, $M = 32$, $SD = 8.22$, range 14-50), Negative Affect Scale (N = 55, $M = 14$, $SD = 4.79$, range 10-31). An independent samples t test indicated there was no significant difference in Positive Affect Ratings while in the waiting room between the two groups, $t(52) = -1.35$, $p = .182$ (bruised face $M = 31.03$, $SD = 7.53$; smiling face $M = 34.31$, $SD = 9.53$).

There was a difference in Negative Affect Ratings. Those exposed to the bruised face DV PSAs reported more negative mood ($M = 14.82$, $SD = 5.39$) than those in the waiting room with the smiling face DV PSAs ($M = 12.06$, $SD = 1.81$), $t(53) = 2.83$, $p = .007$. Cohen's effect size value indicated a moderate to large effect size, $d = .68$.

As in Study 1 and 2, two SPSS macros were used to test whether affect (mood) mediated the relationship between DV PSA exposure condition (bruised face, smiling face) and outcomes (memory, attitudes) (MEDIATE; Hayes & Preacher, 2011; PROCESS, Hayes, 2012) (PROCESS can handle dichotomous outcome variables- e.g., *free recall* variable; see Study 1 for additional information about the macros). Because this study utilized a direct measure of mood state while viewing the ad this was used as the mediating variable.

Free recall, cued recall, recognition. Mood did not mediate the relationship between DV PSA image type and free recall, cued recall, or recognition: the coefficients for the mediation terms were not significant, for Negative mood, p values ranged from .34 to .96, for Positive mood, p values .16 to .84.

Attitudes. To determine if affect rating for the DV PSA predicted *call, donate, or volunteer* ratings, each of the categories of scores for bruised face and smiling face DV PSAs were separately regressed onto valence, arousal, and motivation ratings (for those specific DV ads).

The full model was not significant for *call*, bruised face DV PSAs [$F(3, 53) = .949; p = .432, R^2 = .05$] or for smiling face DV PSAs [$F(3, 53) = .821; p = .49, R^2 = .04$]; or *donate*, for bruised face DV PSAs [$F(3, 53) = 2.07; p = .115, R^2 = .11$], or for smiling face DV PSAs was not significant [$F(3, 53) = .688; p = .56, R^2 = .04$].

The model was however, significant for *volunteer*, bruised face DV PSAs only [$F(3, 53) = 2.93; p = .04, R^2 = .14$]. Cohen's effect size value indicated a small to moderate effect for the full model, $d = .32$. Individual coefficients indicated motivation scores were driving this effect (p values for coefficients for valence, $p = .88$ arousal $p = .39$, motivation $p = .01, \beta = .33$), suggesting greater withdrawal motivation associated with the bruised face DV PSA predicted a higher likelihood of volunteering with the agency associated with the image. The full model for smiling face DV PSAs was not significant [$F(3, 53) = 1.43; p = .25, R^2 = .08$].

To determine if affect rating for the DV PSA predicted *persuasion*, persuasion scores for bruised face and smiling face DV PSAs were separately regressed onto valence, arousal, and motivation ratings (for those specific DV ads). The full model was

significant for bruised face DV PSAs [$F(3, 53) = 5.00; p = .004, R^2 = .22$]. Cohen's effect size value indicated a moderate effect size, $d = .56$. Individual coefficients were not significant (p values for coefficients for valence, $p = .15$ arousal $p = .17$, motivation $p = .09$), suggesting a combined influence of affect ratings (greater negative valence, less arousal, and greater withdrawal motivation predicting higher persuasion scores), but no one dimension driving the effect. The full model for smiling face DV PSAs was not significant [$F(3, 52) = 1.97; p = .129, R^2 = .10$].

Individual Differences

To determine if individual differences moderated the relationship between DV PSA condition and outcomes (memory, attitudes) an SPSS macro (PROCESS, Hayes, 2012) was used to test moderation.

Domestic Violence History. Psychological aggression and physical aggression were examined separately as potential moderators of DV PSA condition on all memory variables (free recall, cued recall, recognition) and call, donate, volunteer, and persuasion ratings. Neither psychological aggression nor physical aggression moderated the relationship between DV PSA condition and free recall, cued recall, or recognition memory. The coefficients for the interaction terms were not significant: psychological aggression x condition, physical aggression x condition: free recall: p values .41 and .69; cued recall: $p = .81$ and .36; recognition: $p = .94$ and .51.

PTSD Symptoms. The same procedure as above was followed with PTSD symptoms in the model. PTSD symptoms did not moderate the relationship between condition and free recall, cued recall, or recognition memory. The coefficients for the

interaction terms were not significant, p values between .09-.54 (there was a trend however, for recognition memory $p = .09$, such that higher levels of PTSD were associated with better memory for bruised faces and worse memory for smiling faces). Cohen's effect size value indicated a small to moderate effect size, $d = .27$ for the full model.

To determine if dating violence (psychological aggression, physical aggression) and PTSD symptoms predicted *persuasion*, persuasion scores for bruised face and smiling face DV PSAs were separately regressed onto all individual difference variables. The model was not significant for bruised face or smiling face, $p = .51$ and $.78$, nor were any of the individual betas significant. Additional regressions were run with call, donate, volunteer rating by DV PSA type as the outcome variables regressed separately onto dating violence (psychological aggression, physical aggression) and PTSD symptoms. One model was significant, [$F(3, 52) = 2.85; p = .046, R^2 = .14; \beta = .29, p = .037$], those higher in PTSD symptoms were more likely to give higher donate ratings to the smiling face ad than those lower in PTSD, Cohen's $d = .32$ suggests a small to moderate effect size for the full model. None of the other models were significant, p values for the full models ranged from .07-.52. The .07 trend was for the model predicting *call* ratings for the smiling face ad, and exhibited the same pattern as the significant model, those higher in PTSD were more likely to rate the smiling face ad as higher in *call* preference than those lower in PTSD, Cohen's $d = .30$, small to moderate effect size.

Discussion

Responses to DV PSAs were examined in a community sample (in contrast to university samples in Studies 1 and 2). There were no significant differences in memory by DV PSA image type, although the means for free recall were in the expected direction. In contrast, recognition memory was associated with a trend such that participants expressed greater confidence in having seen the smiling face ad than the bruised face ad. This contradicts results from previous studies, but can perhaps be explained by the possibility that this group of women with recent domestic violence exposure involving the police may have found the smiling faces ads less comprehensible, and therefore spent more time trying to understand the lack of congruity between image and text.

There were significant differences for call, donate, and volunteer rating and rank preferences by DV PSA image type, with consistent preference for bruised face DV PSAs. Participants also found the bruised face ad more persuasive. This indicates, despite the lack of clear memory results in the Study, the bruised face ads continue to perform best when considering influence on attitudes. It also underscores the importance of having separate memory and attitude measures, as these do not necessarily demonstrate a similar pattern.

Affective responses differed for the two DV PSAs. The bruised face DV PSAs were associated with the most negative affect (valence and mood) and the smiling face DV PSA with the greatest arousal. Bruised face DV PSAs were also associated with greater negative mood state while viewing the ads in the waiting room. Although affective responses did not mediate between DV PSA type and outcomes, affect dimensions did predict the likelihood of volunteering with an agency associated with the

bruised face DV PSA, such that greater withdrawal responses were associated with increased interest in volunteering. In combination, greater negative valence, less arousal, and greater withdrawal motivation predicted higher persuasion scores for the bruised face DV PSA. This suggests affect can in part explain outcomes, although the specific relationship, including the role of various dimensions remains unclear.

Although individual differences (domestic violence, PTSD symptoms) did not appear to function as moderator in the relationship between DV PSA image type and outcomes, there was a trend for recognition memory such that higher levels of PTSD were associated with better memory for bruised face ads and worse memory for smiling face ads. In addition, those higher in PTSD symptoms were more likely to give higher donate ratings to the smiling face ad than those lower in PTSD. Although elaborated in the general discussion section, these results are difficult to interpret and warrant further study.

General Discussion

Across three studies, with random assignment, using a variety of measures and different samples (university and community participants), in both active and passive viewing contexts (including with other ads competing for attention), a clear pattern emerged: bruised face (and bruised body – Study 1) DV PSAs were associated with better memory (Studies 1 and 2), more favorable attitudes towards engagement with the agency (Studies 1, 2 and 3), and higher persuasion ratings (Studies 2 and 3) than smiling face DV PSAs. Effect sizes were typically moderate to high. Multiple outcome measures were used, in a variety of samples, with similar effects. This suggests those designing DV PSAs may want to consider that if their goal is to enhance memory, influence engagement with service providers, and generate ads perceived as persuasive, the bruised face ads appear to be the best choice, when compared to smiling face ads. It is worth noting however, that when bruised bodies were included (Study 1) and compared to bruised faces, memory *for text* was superior in bruised face PSAs. This may be the case due to the potentially less distracting nature of bruised body parts (which may appear somewhat abstract) compared to faces. This interpretation is consistent with the high memory scores for text accompanying landscape images in Study 1.

Future studies should examine the possible reasons why bruised faces and bodies resulted in better outcomes than smiling faces images. It may be that ads featuring images of bruised women convey an immediate need for help, whereas smiling face ads suggest help will be needed in the future. It is also possible that the smiling face ads appear less credible; the woman looks fine, surely she is not in danger.

In understanding emotional responses to DV PSAs, and the potential mediating role of affect in the relationship between DV PSA type and outcomes, the pattern is somewhat less clear. Across three studies various measures of affect were used: psychophysiology (EMG, EDR, ECG/HR), implicit measures (SAM Manikin for valence, arousal, motivation), and self-reported mood state (Negative, Positive affect) during exposure to DV PSAs. In Study 1, although HR (an indicator of the motivation dimension of affect) differed by condition, with bruised face images associated with withdrawal responses, there were few differences in psychophysiology responses between ads, and none of these functioned as mediators between DV PSA type and outcomes. In Study 2 however, a clearer pattern emerged with affect appearing to perform a partially mediating role between DVPSA type and memory (cued recall, recognition). The bruised face ads resulted in greater arousal and negative valence, and these responses seemed to partially mediate the relationship between DV PSA type and memory, although there was no influence of affect on persuasion ratings. In Study 3 affective responses differed by DV PSAs such that bruised faces were associated with more negative valence and negative mood during passive viewing. In contrast to Study 2, in Study 3 smiling face ads were associated with greater arousal than bruised face ads. Affective responses predicted volunteer responses in Study 3, specifically with increased withdrawal associated with greater reported intent to volunteer with agencies associated with bruised face ads. Greater reported intent to engage with agencies associated with images that evoke strong emotions, including withdrawal, may be explained by considering that reported intent to engage may serve an affect regulating function. Affect also predicted persuasion ratings for bruised face ads (greater negative valence, less

arousal, and greater withdrawal motivation predicting higher persuasion scores), although no one dimension appeared to be driving the effect.

Because the three dimensions of affect performed differently across studies, with valence, arousal, and motivation each appearing to differ by DV PSA type, and to exert some influence on outcomes, future studies should continue to investigate these dimensions separately. Although implicit self-report measures (SAM Manikin) seemed more reliability associated with outcomes, a variety of affect measures (e.g., psychophysiology, implicit and explicit self-report measures) should continue to be used in order to further illuminate how these measures may be interrelated. Although these three studies examined affect as mediator in the relationship between DV PSA type and memory and attitude outcomes, it is not clear if mediation actually took place both given the inconsistent nature of results, and the cross-sectional nature of the studies. Future research should examine affect as a potential mechanism for explaining the effect of DV PSA type on outcomes in longitudinal designs.

In addition, future studies should further examine why different high risk samples may respond with different patterns of arousal to various DV PSAs. For women in Study 3 with a recent history of domestic violence involving the police, it may be that the smiling face ads (image/text incongruent) were more arousing than bruised face ads (image/text congruent) because these ads involve anticipatory responses associated with a situation in which they are presumably familiar (the text implies violence will happen, despite the fact that at the moment the woman is smiling and appears fine). In contrast, for undergraduates, with less domestic violence exposure, bruised faces may be more arousing because of the graphic nature of the immediate violence; anticipatory responses

may be less likely given their comparatively lower exposure. Instead, those with less personal experience may find such ads lacking in credibility.

Although individual differences (trauma history, PTSD symptoms) were not significant moderators in any of the analyses, in two studies trends emerged, suggesting the association between individual differences and response to DV PSAs warrants further study. Specially, in Study 1 a trend suggested those high in interpersonal trauma had worse memory for text accompanying bruised faces and better memory for text associated with smiling faces. In Study 3 there was a trend such that higher levels of PTSD were associated with better recognition memory for bruised and worse memory for smiling face ads. Though opposite in direction, these results are not necessarily inconsistent. Study 1 evaluated memory for text accompanying the image, while Studies 2 and 3 evaluated memory for the global ad. It is possible in Study 1 those with a history of greater cumulative interpersonal trauma found it difficult to disengage with the bruised face image in order to process text, while in Study 3, consistent with this interpretation, those high in PTSD symptoms had better global memory for bruised face ads. In both cases these bruised face images may be more attention grabbing for those who identify with the bruised victim portrayed in the ad (highest in cumulative interpersonal trauma and PTSD symptoms). These are trend level results, and should not be over interpreted. Effect sizes, however, although small to moderate for PTSD, were large for interpersonal trauma. This pattern of results suggests the role of individual differences in responses to DV PSAs merits further exploration.

In summary, these studies provide important information specifically relevant to the design of domestic violence public service campaigns and broadly relevant to

understanding the role of emotional responses and individual differences in outcomes associated with various types of domestic violence PSAs. In particular, Studies 2 and 3 provide a realistic passive viewing context, measuring global memory for the ad and actual volunteer behavior, utilizing an experimental design (random assignment to condition in Study 3 and quarter-wise matched groups for Study 2). The use of multiple studies, with multiple measures, with two populations at risk for future domestic violence, in settings that mirror actual exposure contexts, underscores the applicability of this ecologically valid research to real world settings.

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Appendix 1

Domestic/ dating violence on campus vignettes

Scenario 1: You and a friend live on the same wing in the dorms. You walk by her room and hear her crying. In the past, she has shared with you that her boyfriend yells at her, humiliates her, and always wants to know where she is and who she's with. She also says he won't let her do things she wants to. It appears she has some fresh bruises around her eye and on her arms. What do you do?

Scenario 2: A friend pushes and then slaps his girlfriend at a party. Other people see it and are upset but don't do anything. He's not a very close friend, but someone you've taken several courses with and have had some class related discussions. What do you do?

Scenario 3: You live in the dorms and overhear your RA having a conversation with his girlfriend, who you also know. The conversation is getting pretty heated and you hear him call her "slut". The RA demands that she give him her cell phone so he can check her text messages. The girlfriend tries to leave but the RA says, "You're not going anywhere until we get to the bottom of this," and blocks her from leaving. What do you do?

Table 1

Study 1: Mean Memory Score for Text for all PSAs (with Standard Deviations and Range in Parentheses)

PSA Type	Condition	
	Within Groups (N = 68)	Between Groups (N = BF 23, SF 24, BB 21)
Bruised face DV	.52 (.54, 0-2.50)^a	3.01(1.90, 0-8.75)^a
Smiling face DV	.29 (.40, 0-2.00)^b	3.50 (1.20, 0-8.0)
Bruised body DV	.81 (.61, 0-2.50)^c	4.21 (2.0, 2.25-10.25)^b
Smoking oxygen mask face	.60 (.59, 0-2.50)	.959 (.746, 0-3.50)
Smoking smiling face	.43 (.47, 0-2.00)	.842 (.759, 0-3.50)
<i>Neutral (landscape)</i>	.83 (.59, 0-2.50) [^]	-
Neutral (healthy eating)	.68 (.57, 0-2.25)	-

Different letters indicate significant differences when DV ads are compared to one another within condition. Memory scores for text are summed across ads. Total possible score for all ad types for within groups = 5.0. Total possible scores for between group stimuli for DV ads = 30.0; for smoking ads = 15.0. Means for the between DV PSA condition are provided in this note for comparison with the single item DV used within groups: bruised face $M = .50$ ($SD = .32$); smiling face $M = .59$ ($SD = .32$); bruised body $M = .70$ ($SD = .32$). All PSAs were compared (within condition). [^]Memory for text accompanying the bruised face DV PSA images was significantly different from landscape image ads ($p = .001$) but not significantly different from other non-DV ads. Memory for text associated with the bruised body DV PSA images differed significantly from both type of smoking ads, but did not differ from either of the neutral ads.

Table 2

Study 1: Mean Attitude towards Engagement for DV PSAs (with Standard Deviations in Parentheses)

	PSA Type	Attitude toward Engagement			
		Scale (N = 68) (ratings 1-5)	Rank (Forced Choice, N = 67)		
			1 st	2 nd	3 rd
Call	Bruised face^a	3.07	31 (46%)	18 (27%)	18 (27%)
	Smiling face^b	2.90	18 (27%)	16 (24%)	33 (49%)
	Bruised body	3.03	19 (28%)	33 (49%)	15 (22%)
Donate	Bruised face	2.43	24 (36%)	20 (30%)	22 (33%)
	Smiling face^a	2.26	16 (25%)	16 (25%)	33 (51%)
	Bruised body^b	2.40	25 (38%)	30 (45%)	11 (17%)
Volunteer	Bruised face	2.91	23 (34%)	18 (27%)	26 (39%)
	Smiling face	2.93	23 (34%)	22 (33%)	22 (33%)
	Bruised body	2.93	21 (31%)	27 (40%)	19 (28%)

Different letters indicate significant differences between DV PSA ad types, rank data only, based on the Wilcoxon paired signed rank which determines if there is a significant difference by condition based on medians. Bolded percentages in Rank column indicate highest frequency rank preference.

Table 3

Study 1: Mean Psychophysiology Difference Scores (Stimulus Response minus Baseline Response) for all PSAs (with Standard Deviations and N in parentheses)

PSA Type	Condition	
	Within	Between
<i>EMG (corrugator zygomaticus difference - baseline¹)</i>		
Bruised face (BF) DV	.282 (.593, 59)	.237 (.437, 19)
Smiling face (SF) DV	.239 (.438, 62)	.237 (.347, 23)
Bruised body (BB) DV	.289 (.670, 58)	.265 (.320, 19)
Smoking oxygen mask	.185 (.419, 60)	-
Smoking smiling face	.141 (.358, 60)	-
Landscape	.120 (.768, 61)	-
Healthy Eating	.117 (.669, 58)	-
<i>EDR (EDR – baseline)</i>		
Bruised face (BF) DV	.000049 (.001120, 61)	.000048 (.000941, 20)
Smiling face (SF) DV	-.000005 (.000627, 61)	.000151 (.000544, 22)
Bruised body (BB) DV	.000106 (.000360, 61)	.000334 (.000285, 18)
Smoking oxygen mask	.000206 (.000389, 60)	-
Smoking smiling face	.000138 (.000598, 61)	-
Landscape	.000030 (.000798, 61)	-
Healthy Eating	.000068 (.000486, 61)	-
<i>Heart Rate (HR - baseline)</i>		
<i>Bruised face (BF) DV²</i>	<i>-1.193 (5.300, 58)^a</i>	<i>-1.777 (5.720, 19)^a</i>
<i>Smiling face (SF) DV</i>	<i>.466 (4.932, 58)^b</i>	<i>1.746 (3.429, 20)^b</i>
<i>Bruised body (BB) DV</i>	.384 (5.677, 58)	.613 (3.952, 19)
Smoking oxygen mask	.840 (4.725, 58)	-
Smoking smiling face	.917 (4.315, 58)	-
Landscape	.890 (6.981, 58)	-
Healthy Eating	-.212 (6.015, 57)	-

¹Positive values represent predominance of negative valence. ²Heart rate for both within and between conditions, although not significant in the omnibus test, trended towards significance, within condition [$F(2, 114) = .293, p = 0.06$], and between condition [$F(2, 55) = 3.16, p = 0.05$]. Follow up planned simple contrasts indicated significant differences between bruised face and smiling face DV PSA in both the within and between conditions (different letters indicate significant differences between DV PSA ad types). The smoking ads were not significantly different from each other, nor were the neutral ads. The bruised face DV PSAs were not significantly different from other ads. The bruised body DV PSA differed significantly from both types of smoking ads, but did not differ from either of the neutral ads.

Table 4

Study 2: Mean Memory Scores for all PSAs, with Comparisons across Conditions (Standard Deviations in Parentheses)

Memory measure	Condition		Comparison of Conditions		
	Bruised Face	Smiling Face	t(df)	<i>p</i>	<i>Cohen's d</i>
Free recall	.70 (.41)	.38 (.41)	4.89 (164)	< .001	.78
Cued recall	5.22 (.89)	4.30 (1.23)	5.57 (162)	< .001	.88
Recognition	5.14 (1.46)	3.96 (2.0)	4.99 (205)	< .001	.79

Conditions differ, $p < .001$. Fall and Winter quarter only.

Table 5

Study 2: *Intervention by Type for Vignettes*

	Call/share Hotline	Call/share organization	Contact family/ friend/advisor	Reconcile couple	Do nothing
Total (N = 214)	62%	64%	94%	35%	33%

Note: there were no significant differences by condition in responses so percentage for total participants reported here. Responses include a “yes” to in the category for any of the 3 vignettes.

Table 6

Study 2: *Volunteer Engagement by Category*

Condition (<i>N</i>)	Any Interest [^]	General Info	Event Updates	Volunteering	Member
Bruised Face (120)	58 (48%)^a	40 (70%)^a	21 (36%)	29 (50%)	11 (19%)
Smiling Face (118)	35 (30%)^b	20 (57%)^b	12 (34%)	19 (54%)	10 (29%)
Control (61)	37 (61%) ^a	28 (76%) ^a	14 (38%)	15 (41%)	4 (11%)

Different subscripts indicate differences between conditions within that category. [^]Four additional categories represent a subgroup of those expressing any interest. Only volunteer forms for Fall and Winter quarter are included (*N* = 299). The control condition did not differ from the bruised face condition.

Table 7

Study 2: Affect as Partial Mediator in Relationship between DV PSA Condition and Memory

	Mediator Regression β	Indirect Effect	S.E. (bootstrapping)	95% CI
<i>Free Recall</i>				
Valence	.04	-.013	.012	-.041 to .006
Arousal	-.01	.021	.038	-.058 to .094
Motivation	.03	-.012	.011	-.039 to .006
<i>Cued Recall</i>				
Valence	-.17*	.102	.059	.001 to .233
Arousal	.15*	-.167	.093	-.38 to -.02
Motivation	.02	-.006	.021	-.06 to .03
<i>Recognition</i>				
Valence	-.10	.058	.079	-.08 to .25
Arousal	.31**	-.33	.135	-.62 to -.09
Motivation	-.04	.010	.036	-.05 to .11

* $p < .05$, ** $p < .01$, *** $p < .001$. Note: the MEDIATE macro (Hayes & Preacher, 2011) produces unstandardized coefficients. Hayes states, “unstandardized coefficients are the preferred metric in causal modeling” (<http://www.afhayes.com/macrofaq.html>).

Table 8

Study 3: Mean Memory Scores DV PSAs, with Comparisons across Conditions (Standard Deviations in Parentheses)

Memory measure	Condition		Comparison of Conditions	
	Bruised Face	Smiling Face	t(df)	p
Free recall	.80 (.41)	.69 (.48)	.81(1) ²	= .49
Cued recall ¹	6.25 (1.48)	6.40 (.91)	.45 (53)	= .65
Recognition	3.05 (2.33)	4.33 (2.16)	1.85 (53)	= .07

Conditions do not differ, $p > .05$. The trend for recognition memory suggests it was better for smiling face, effect size value Cohen's $d = .42$. ¹T/F results for only DV PSA specific questions reported here. ²This is reported as chi squared, p value obtained using Fischer's exact test (outcome variable is dichotomous).

Table 9

Study 3: Mean Attitude toward Engagement DV PSAs (with Standard Deviations in Parentheses)

		Attitude toward Engagement		
		Scale (N = 57) (ratings 1-5)	Rank (Forced Choice)	
	PSA Type		1 st	2 nd
Call	Bruised face	4.23 (1.10)***	49 (87%)	7 (13%)***
	Smiling face	3.26 (1.42)***	7 (13%)	49 (87%)***
Donate	Bruised face	3.81 (1.13)***	53 (96%)	2 (4%)***
	Smiling face	3.02 (1.43)***	2 (4%)	52 (96%)***
Volunteer	Bruised face	4.05 (1.10)***	51 (93%)	4 (7%)***
	Smiling face	3.42 (1.38)***	4 (7%)	50 (93%)***

Significant differences, *** $p < .001$.

Table 10

All Studies: Indicating What Memory, Attitude, Affect and Individual Difference Variables were Measured in Each Study

	Study 1	Study 2	Study 3
<i>Memory</i>			
Recognition	-	X	X
Cued Recall	X	X	X
Free Recall	-	X	X
<i>Attitudes</i>			
Call, Donate, Volunteer	X	-	X
Volunteer with campus group	-	X	-
Response to Vignettes	-	X	-
Persuasion Ratings	-	X	X
<i>Affect</i>			
EMG (valence)	X	-	-
EDR (arousal)	X	-	-
ECG/HR (motivation)	X	-	-
SAM Manikin (3 dimensions of affect)	-	X	X
PANAS-X (mood)	-	-	X
<i>Individual Difference</i>			
THQ (trauma history)	X	-	-
CTS-2 (domestic violence)	-	X	X
PDS (PTSD)	X	X	X

Table 11

All Studies: Effect Size for Significant Difference between Bruised and Smiling Face DV PSAs on Outcome Variables

	Cohen's <i>d</i> effect size					
	Study 1 (<i>N</i> = 68)		Study 2 (<i>N</i> = 263)		Study 3 (<i>N</i> = 57)	
	BF	SF	BF	SF	BF	SF
<i>Memory</i>	(memory text only)		(memory global ad)		(memory global ad)	
Free Recall	.48 (<i>within</i> , between <i>ns</i>)		.78		<i>ns</i>	
Cued Recall	-		.88		<i>ns</i>	
Recognition	-		.79		<i>ns</i> [^]	
<i>Attitudes</i>						
Call (c), donate (d), volunteer (v)	<i>ns</i>		-		.70r(c), .68r(d), .69r(v)	
Persuasion	.56R(c)		-		.74R(c), .90R(d), .83R(v)	
Volunteer forms	-		1.70		1.66	
	-		.38, .36		-	

BF = bruised face; SF = smiling face; BB = bruised body, *ns* = nonsignificant. Bruised body data has not been included from Study 1. Call, donate, volunteer data: r = ratings, R = rank. A dash (-) indicates the measure was not included in the particular study. [^]Although nonsignificant, the effect size for Study 3 recognition (trending, $p = .07$) was $d = .42$, in the direction of better memory for smiling face ads.