

# How Does It Feel to Be a Woman Victim of Sexual Harassment? The Effect of 360°-Video-Based Virtual Reality on Empathy and Related Variables

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## Abstract

Sexual harassment (SH) occurs when people—mostly women—are targets of unwanted sexual comments, gestures, or actions associated with a lack of empathy on the part of the offender. Virtual Reality (VR) has been defined as the “ultimate empathy machine” because it allows the user to take other people’s perspective. The present work aims to study the effect of a 360°-video-based VR experience (vs. traditional perspective-taking task) on empathy and related concepts (i.e., violent attitude, perspective taking, sense of oneness) toward a female victim of SH in a male sample. A within-subjects design was used with 44 men who experienced both conditions (360° and narrative). Results showed the superiority of the 360°-video experience over the narrative in increasing empathy, sense of oneness, and perspective taking toward a female victim of SH. Limitations and future directions are discussed.

**Keywords:** sexual harassment, empathy, perspective taking, embodiment, 360°-video-based VR, immersive technology

## Introduction

SEXUAL HARASSMENT (SH) occurs when people—mostly women—are targets of unwanted sexual comments, gestures, or actions.<sup>1</sup> Previous studies have found that a lack of empathy and, specifically, a lack of perspective taking are associated with aggressive behaviors, including SH.<sup>2</sup> *Empathy* is considered a personal skill that moderates aggressive behavior.<sup>3</sup> It is composed of cognitive empathy (the intellectual ability to understand another person’s emotions and mental state) and emotional empathy (the feeling of being affected by and sharing another’s emotions).<sup>4</sup> Studies show that offenders have lower levels of both cognitive and emotional empathy than the general population.<sup>5</sup> One possible reason is that individuals with low levels of empathy do not understand the other person’s distress, and they are unable to take the perspective of the victim.<sup>6</sup> The *perspective-taking* ability is a specific component of em-

pathy that has been defined as the ability to “put oneself in another person’s shoes.”<sup>7</sup>

Virtual reality (VR) has been called the “ultimate empathy machine” because it allows a person to take the perspective of someone else.<sup>8</sup> VR can induce feelings of being present in the virtual environment (sense of presence) and generate the illusion of inhabiting a virtual body (sense of embodiment).<sup>9</sup> Previous studies have found that taking the perspective of someone else through VR can be an effective way to promote empathy in different situations, such as increasing helping behavior,<sup>10</sup> reducing implicit racial bias,<sup>11</sup> or decreasing prejudice.<sup>12</sup> More specifically, recent studies have focused on modifying violence toward women and increasing empathy in men through the embodiment of virtual female avatars. They have shown promising findings, such as improving the men’s ability to recognize the woman’s emotions,<sup>13</sup> reducing the shock given to a woman on a VR obedience task,<sup>14</sup> and creating a

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sensation of fear, helplessness, and vulnerability in a scene of intimate partner violence.<sup>15</sup>

The 360° video is considered a subfield of VR where contents can be displayed on different devices (e.g., laptop, rotating a mobile phone, Head Mounted Display). By showing the 360° content through a Head Mounted Display, it is possible to become fully immersed in the virtual scenario, giving the user the illusion of being there.<sup>16,17</sup> Previous literature has found that the 360°-video-based VR is effective in increasing empathy in several contexts. For instance, the work “Cloud Over Sidra” showed changes in perspective taking and a high sense of presence.<sup>18</sup> More specifically, in the field of SH, Steinfeld<sup>19</sup> found that the use of 360° video predicted—among other variables—a decrease in stereotypical views of SH.

Hence, there is scarce empirical evidence about the application of 360° video to embody a woman’s virtual body and its potential effects on modifying variables involved in SH. This study aims to analyze the effect of using 360° video from a first-person perspective on empathy and related concepts (i.e., violent attitude, perspective taking, sense of oneness) toward a female victim of SH in a sample of men. To do so, two conditions are compared: a 360°-video (VR task) condition and a narrative (traditional perspective-taking task) condition, using a counterbalanced within-subjects design.<sup>a</sup> We hypothesized that participants would show more positive changes in empathy, violent attitudes, perspective taking, and sense of oneness with the victim after the 360° video than after the narrative. Moreover, we expected a carryover effect on the change in the dependent variables when the participants experienced the 360° video before the narrative. Finally, we expected that the sense of embodiment and presence would be high, and sickness would be low in the 360° video.

## Method

### Participants

Forty-four Mexican men participated in this study. The exclusion criteria were being  $\leq 18$  years old, having physical problems that could inhibit free movements; a history of SH with legal consequences; use or abuse of drugs; and receiving psychological treatment. Descriptive statistics for the sociodemographic and trait measures are shown in Table 1.

### Measures

Measures administered at baseline. These measures were administered to provide a description of the sample (Table 1).<sup>b</sup>

*Machismo–Chivalry: Machismo and Caballerismo Scale*<sup>20</sup>. It contains 20 items (1 = strongly disagree; 7 = strongly agree) and two subscales.

*Empathetic abilities: interpersonal reactivity index*<sup>21,22</sup>. It contains 28 items (1 = strongly disagree; 7 = strongly agree) and four subscales.

*Alexithymia: Toronto Alexithymia Scale (TAS-20)*<sup>23,24</sup>. It contains 20 items (1 = strongly disagree; 7 = strongly agree) and three subscales.

*Social desirability: social desirability scale*<sup>25,26</sup>. It contains 33 items (true–false response) and two subscales.

TABLE 1. DESCRIPTIVE STATISTICS OF SOCIODEMOGRAPHIC AND TRAIT MEASURES (N=44)

	M (SD)	%	$\alpha$
Age	26.20 (8.36)	—	
Educational level			
Secondary studies	—	6.8	
Degree	—	77.3	
Master	—	15.9	
History of mental or chronic illness (% yes)	—	9.1	
Alcohol consumption			
Never	—	25.0	
Once per month	—	36.4	
2–4 times per month	—	34.1	
>2–3 times a week	—	4.5	
Machismo and Chivalry (MCS)			
Machismo	2.01 (0.84)	—	0.80
Chivalry	5.36 (0.97)	—	0.78
Empathetic abilities (IRI)			
Perspective taking	4.78 (0.77)	—	0.60
Fantasy	4.66 (0.99)	—	0.74
Empathy concern	5.17 (0.81)	—	0.67
Personal distress	3.15 (1.13)	—	0.83
Alexithymia (TAS-20)			
Difficulty in express feelings	3.67 (1.46)	—	0.84
Externally oriented thinking	2.49 (0.73)	—	0.51
Difficulty in identify feelings	2.93 (1.47)	—	0.91
Social desirability (SDS)			
Attribution	1.63 (0.18)	—	0.66
Denial	1.46 (0.25)	—	0.81

Cronbach’s alphas are referred to the internal consistency of the sample of this study.

MCS, Machismo and Caballerismo Scale; IRI, interpersonal reactivity index; TAS-20, Toronto Alexithymia Scale; SDS, social desirability scale.

Measures administered at baseline, after the 360° video and the narrative

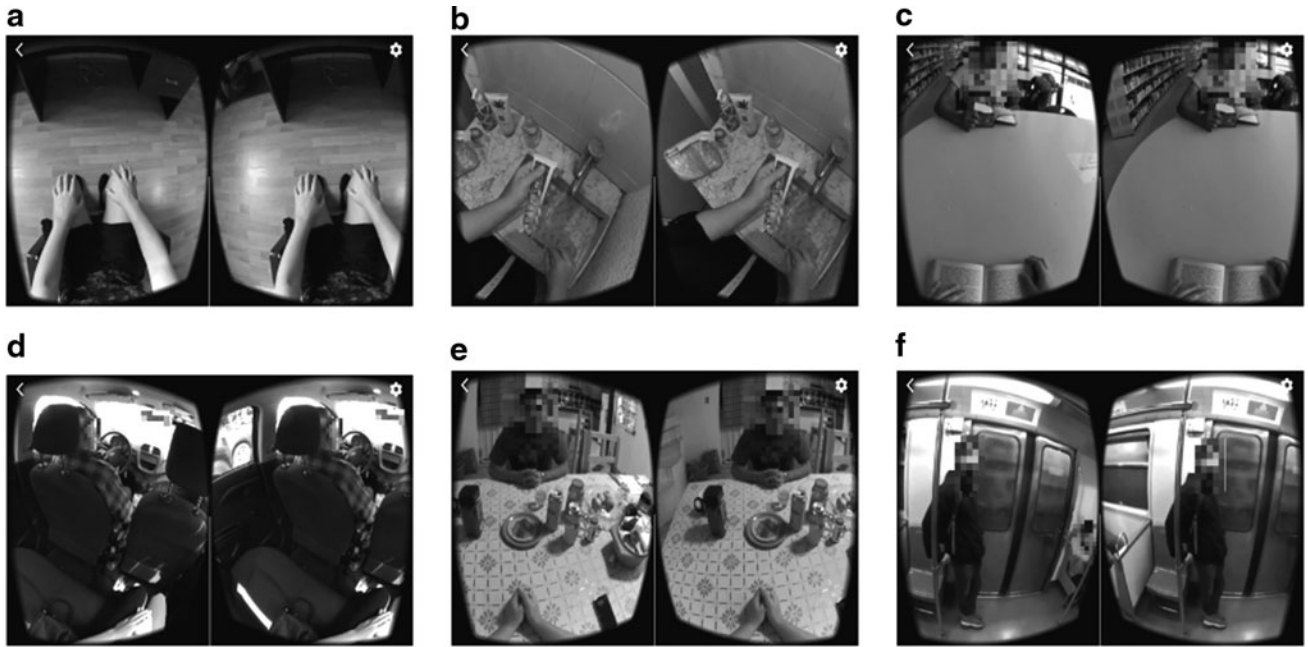
*Empathy: empathy scale.* This is an *ad hoc* self-report containing five items (1 = not at all; 5 = totally) that measure empathy state, based on a previous study<sup>27</sup> (Appendix A1).

*Violent attitude: attitude toward gender-based violence scale.* This is an *ad hoc* self-report with five items (1 = not at all; 5 = totally), based on the original scale of Ambivalent Sexism<sup>28</sup> (Appendix A2).

Measures administered after the 360° video and the narrative

*Sense of oneness: inclusion of other in the self scale*<sup>29</sup>. It contains seven Venn-like diagrams that represent the sense of oneness (i.e., closeness and connectedness) with the victim, where a greater overlap between the two circles represents a closer relationship (Appendix A3).

*Perspective taking: perspective-taking scale.* This is an *ad hoc* self-report based on a previous study,<sup>27</sup> and it consists of eight items (1 = not at all; 5 = totally) that measure participants’ capacity to take the perspective of the victim (Appendix A4).



**FIG. 1.** Screenshots of the sexual harassment scenarios in the 360°-video VR experience. (a)=embodiment induction; (b)=daily activities; (c)=library harassment; (d)=taxi harassment; (e)=spouse harassment; (f)=subway harassment.

Measures administered after the 360° video

*Embodiment, presence, and sickness scale.* It contains 16 items (1 = strongly disagree; 7 = strongly agree). Ten items were adapted from Longo’s questionnaire to assess the embodiment of the victim’s body<sup>30</sup> ( $\alpha=0.88$ ); three items were developed to assess the sense of presence felt during the 360° video<sup>31</sup> ( $\alpha=0.46$ ); and three items were developed to detect sickness during the 360° video<sup>32</sup> ( $\alpha=0.87$ ) (Appendix A5).

Development of the 360° video

The 360° video was recorded with the LG360-105 camera. To create the first-person perspective, the camera was attached to the female performer’s head with a proper support. The content was developed according to the results of a previous focus group with female participants who described the type of SH that occurs in the city (Fig. 1). The scenarios are described in Appendix A6.

Procedure

The experiment took place at Universidad Nacional Autónoma de México. After signing the informed consent and answering the baseline questionnaires, participants were counterbalanced in the two conditions (Table 2). In the 360°-video condition, participants watched the video to experience what it is like to be a female victim of SH from a first-person perspective. The narrative condition consisted of the same story—but in text format—and they had to imagine the content of the story as if it were happening to them. This task lasted ~10 minutes.

After the experience of the first condition, participants answered the Empathy Scale (ES), Attitude Toward Gender-Based Violence Scale (ATG-S), Inclusion of Other in the Self Scale (IOS), and Perspective-Taking Scale (PT-S) questionnaires (and Embodiment, Presence, and Sickness Scale in the

case of the 360° condition). Then, participants carried out the second condition (360° video or narrative depending on what they did first) and again filled in the questionnaires. All procedures and materials were approved by the Ethics Committee of the Universidad Nacional Autónoma de México (registration number: EP/PMDPSIC/0151/19).

Data analyses

All statistical analyses were performed using the SPSS v.26. First, two 3×2 mixed-design ANOVAs with 3 time points (baseline, 360° video, narrative) as within-subjects factor and order of the conditions’ presentation (360° video→narrative, narrative→360° video) as between-subjects factor were performed to analyze the effects of the condition (360° video vs. narrative) on ES and ATG-S (main effect of time) and the effects of the order of the conditions on these measures (interaction effect). Second, two 2×2 mixed-design ANOVAs with 2 time points (360° video, narrative) as within-subjects factor and order of the conditions’ presentation as between-subjects factor were performed to analyze the effects of the condition on the IOS and PT-S. *Post hoc* analyses using Bonferroni

TABLE 2. STRUCTURE OF THE COUNTERBALANCING METHOD

Group 1 (n = 22)	Group 2 (n = 22)
1. Answer to the pretest (T1)	1. Answer to the pretest (T1)
2. Watch the 360° video	2. Read the narrative
3. Answer to the post-test (T2 <sub>I</sub> )	3. Answer to the post-test (T2 <sub>I</sub> )
4. Read the narrative	4. Watch the 360° video
5. Answer to the post-test (T2 <sub>II</sub> )	5. Answer to the post-test (T2 <sub>II</sub> )

corrections were carried out when significant effects were found. Third, one-sample *t*-tests were conducted to explore whether the effect of the 360°-video condition on the embodiment scores, the sense of presence, and sickness were significantly different from the chance level of 4 (on a scale ranging from 1 to 7). Cohen's *d* for the one-sample *t*-test was calculated using JASP v.0.11.1.<sup>33</sup> Fourth, Pearson's correlations were conducted among the outcome variables of this study. Finally, because a convenience sample of 44 men was used for practical reasons, a *post hoc* power analysis was conducted.<sup>c</sup>

## Results

### *Effect of the condition (360° video vs. narrative) on empathy (ES) and violent attitude (ATG-S)*

In the case of ES, a  $3 \times 2$  mixed-design ANOVA showed a significant effect of time. *Post hoc* analyses showed significant differences between the scores at baseline and the scores after the 360° video ( $p < 0.001$ ), and between baseline and after the narrative ( $p < 0.001$ ). Participants scored higher after both tasks (vs. baseline). There were no significant differences between conditions ( $p = 0.060$ ) (Table 3). Moreover, there was a significant interaction effect between the time and the order of presentation. *Post hoc* analyses showed no significant differences after the 360° video, regardless of the order ( $p = 0.821$ ). However, significant differences were found after the narrative depending on the order ( $p = 0.030$ ), with higher scores when the narrative was delivered after the 360° video rather than before the 360° video (Fig. 2).

In the case of ATG-S, a  $3 \times 2$  mixed-design ANOVA showed a significant effect of time. *Post hoc* analyses showed significant differences between baseline and the 360°-video task ( $p = 0.007$ ), and between baseline and the narrative task ( $p = 0.006$ ). Participants scored higher after both tasks (vs. baseline). There were no significant differences between conditions ( $p = 1.00$ ) (Table 3). There was no significant interaction effect between the time and the order of presentation (Fig. 2).

### *Differences between conditions in the sense of oneness with the victim (IOS) and perspective taking (PT-S).*

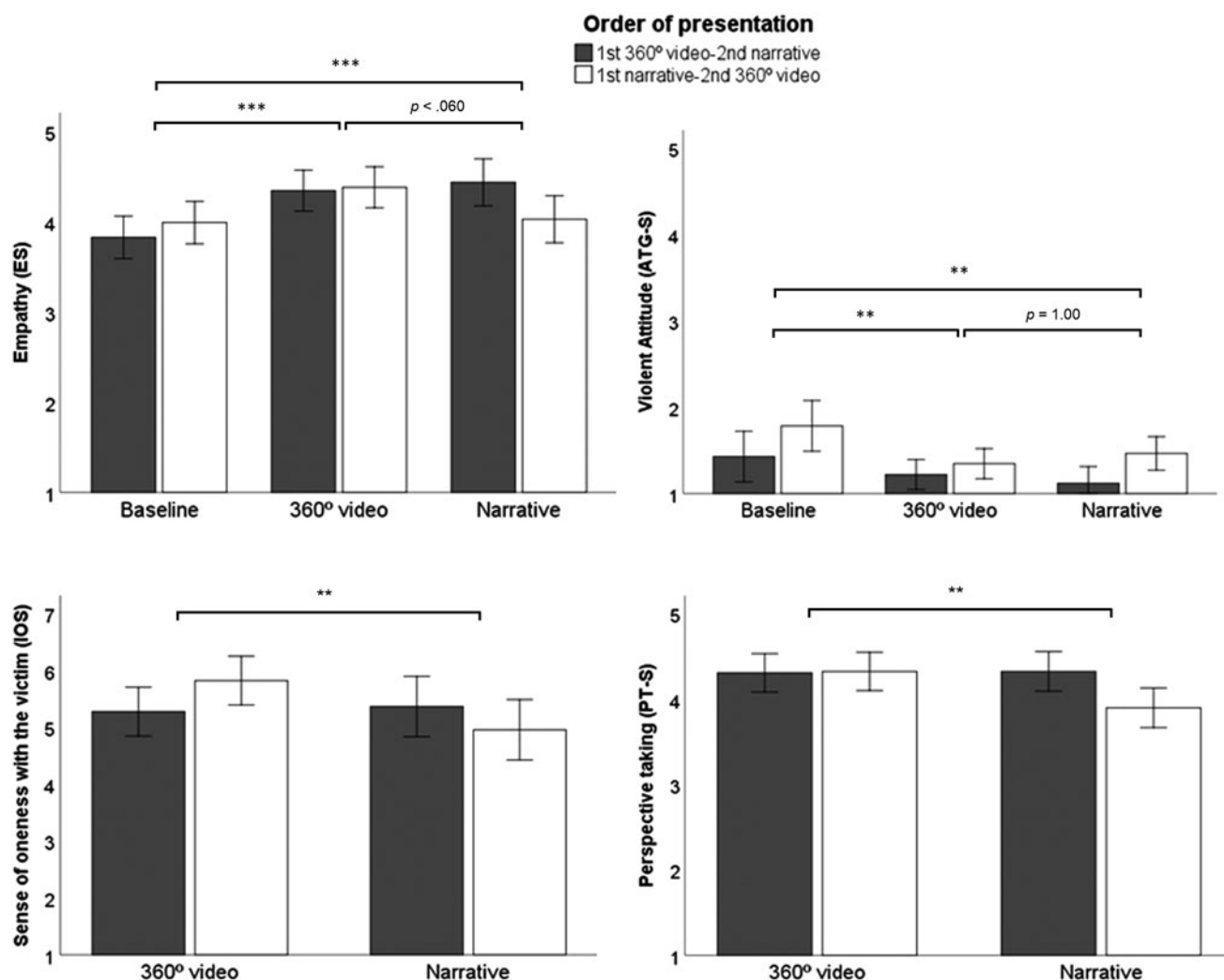
In the case of IOS, a  $2 \times 2$  mixed-design ANOVA showed a significant main effect of time. The IOS was significantly higher after the 360° video than after the narrative (Table 3). Moreover, there was a significant interaction effect between the time and the order of presentation. However, *post hoc* analyses showed that there were no significant differences in the IOS after the 360° video ( $p = 0.076$ ) or after the narrative ( $p = 0.278$ ) depending on the order of presentation (Fig. 2).

In the case of PT-S, a  $2 \times 2$  mixed-design ANOVA showed a significant main effect of time. PT-S was significantly higher after the 360° video than after the narrative (Table 3). Moreover, there was a significant interaction effect between the time and the order of presentation. *Post hoc* analyses showed no significant differences after the 360° video depending on the order of presentation,  $p = 0.914$ . However, PT-S was higher after the narrative when it was presented after the 360° video rather than before it,  $p = 0.012$  (Fig. 2).

TABLE 3. MEANS, STANDARD DEVIATIONS, CRONBACH'S ALPHAS, AND ANOVAS RESULTS FOR THE DEPENDENT VARIABLES IN THIS STUDY AT EACH TIME POINT IN THE WITHIN-SUBJECTS DESIGN

	Baseline			After the 360° video			After the narrative			Main effect of time		Interaction effect time x order of presentation	
	M	SD	$\alpha$	M	SD	$\alpha$	M	SD	$\alpha$				
Empathy (ES)	3.91	0.55	0.45	4.36	0.52	0.65	4.23	0.63	0.75	$F(1.64, 68.92) = 19.95$ , $p < 0.001$ , $\eta^2_p = 0.32$	$F(1.64, 68.92) = 8.25$ , $p < 0.001$ , $\eta^2_p = 0.16$		
Violent attitude (ATG-S)	1.60	0.70	0.54	1.28	0.41	0.40	1.29	0.48	0.57	$F(1.63, 68.31) = 8.83$ , $p < 0.001$ , $\eta^2_p = 0.17$	$F(1.63, 68.31) = 1.08$ , $p = 0.343$ , $\eta^2_p = 0.03$		
Sense of oneness with the victim (IOS)	—	—	—	5.55	1.02	—	5.16	1.24	—	$F(1.42) = 10.44$ , $p = 0.002$ , $\eta^2_p = 0.20$	$F(1.42) = 15.94$ , $p < 0.001$ , $\eta^2_p = 0.28$		
Perspective taking (PT-S)	—	—	—	4.32	0.52	0.78	4.11	0.57	0.82	$F(1.42) = 8.87$ , $p = 0.005$ , $\eta^2_p = 0.17$	$F(1.42) = 10.41$ , $p = 0.002$ , $\eta^2_p = 0.20$		

ES, Empathy Scale; ATG-S, Attitude Toward Gender Scale; IOS, Inclusion of Other in the Self Scale; PT-S, Perspective-Taking Scale.



**FIG. 2.** Graphical representations of the order effect of presentation of the 360° video and narrative on the main dependent variables in the study. \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ . Symbols of significance are referred to the *post hoc* analyses of the main effects of time. Error bars represent the 95% confidence interval of the mean. ES, Empathy Scale; ATG-S, Attitude Toward Gender Scale; IOS, Inclusion of Other in the Self Scale; PTS, Perspective-Taking Scale.

**TABLE 4.** MEANS, STANDARD DEVIATIONS, AND ONE-SAMPLE T-TEST FOR EMBODIMENT, SENSE OF PRESENCE, AND SICKNESS AFTER THE 360° VIDEO

	<i>M (SD)</i>	<i>One-sample t-tests*</i>
Location (embodiment)	5.82 (1.33)	$t(43)=9.04, p<0.001, d=1.36$
Ownership (embodiment)	5.12 (1.10)	$t(43)=6.79, p<0.001, d=1.02$
Agency (embodiment)	4.28 (1.50)	$t(43)=1.24, p=0.222, d=0.19$
Sense of presence	5.23 (1.00)	$t(43)=8.23, p<0.001, d=1.24$
Sickness	4.64 (2.02)	$t(43)=2.09, p=0.043, d=0.32$

\*One-sample *t*-tests were conducted considering the chance level of 4 (on a scale ranging from 1 to 7).

#### *Effects of the 360° video on embodiment, presence, and sickness*

Descriptive statistics and one-sample *t*-test results are shown in Table 4. Embodiment scores were significantly greater than the chance level of 4 for location and ownership, but not for agency. Scores on sense of presence were also greater than the chance level of 4. Similarly, scores on sickness were also greater than the chance level of 4.

#### *Relationships among the outcome variables of the study*

Pearson's correlations among the outcome variables are shown in Table 5. Positive significant correlations were found between: (1) ownership and IOS and PT-S after the 360° video, but also after the narrative; (2) location and IOS after the 360° video; (3) agency and PT-S after the 360° video; (4) sense of presence and IOS and PT-S after the 360° video, but also after the narrative. Moreover, sense of presence

TABLE 5. RELATIONSHIPS BETWEEN OUTCOME VARIABLES (ES, ATG-S, IOS, PT-S) AND EMBODIMENT, SENSE OF PRESENCE, AND SICKNESS

	Change in empathy (ES) (baseline – 360° video)	Change in empathy (ES) (baseline – narrative)	Change in violent attitude (ATG-S) (baseline – 360° video)	Change in violent attitude (ATG-S) (baseline – narrative)	Sense of oneness with the victim (IOS) after 360° video	Sense of oneness with the victim (IOS) after narrative	Perspective taking (PT-S) after 360° video	Perspective taking (PT-S) after narrative
Ownership	0.06	0.14	0.13	0.17	0.62***	0.41**	0.72***	0.38*
Location	0.14	0.17	0.21	0.09	0.31*	0.26	0.30	0.16
Agency	0.12	0.11	0.01	-0.14	0.19	0.16	0.35*	0.13
Sense of presence	0.22	0.35*	0.22	0.14	0.39**	0.37*	0.42**	0.41**
Sickness	-0.02	0.18	-0.26	-0.19	0.32*	0.37*	0.17	0.30
M (SD)	0.45 (0.52)	0.32 (0.63)	-0.32 (0.66)	-0.31 (0.63)	5.55 (1.02)	5.16 (1.24)	4.32 (0.52)	4.11 (0.57)

\*\*\* $p < 0.001$ .\*\* $p < 0.01$ .\* $p < 0.05$ .

ES, Empathy Scale; ATG-S, Attitude Toward Gender Scale; IOS, Inclusion of Other in the Self Scale; PT-S, Perspective-Taking Scale.

and change in ES after the narrative were correlated; (5) sickness was positively correlated with IOS after the 360° video and the narrative.

## Discussion

Results of this study showed that both types of tasks (360° video and narrative) led to changes in empathy and violent attitudes, compared with baseline, in a sample of men. In addition, we found a tendency (marginally significant) to experience higher empathy after the 360° video than after the narrative. Furthermore, we found a carryover effect of the 360°-video condition. That is, empathy after the narrative was significantly higher when the 360° video was presented before the narrative task rather than after it. In contrast, there were no differences between conditions in violent attitude, which suggests that, compared with empathy, the violent attitude is a more rational process that can be manipulated similarly with both strategies. However, these findings should be interpreted with caution because the internal consistency of these self-reports is limited.

Regarding the sense of oneness and perspective taking, they were significantly higher after the 360° video than after the narrative task. A carryover effect on perspective taking was also found because scores in the narrative condition were higher when the 360° video was presented before the narrative task than when it was presented after it. These results confirm previous findings that highlight VR's potential to induce changes in perspective taking and the sense of oneness<sup>8</sup> in the context of violence toward women through embodying a female's body.<sup>14,15,19</sup> Moreover, the carryover effects of the 360° video on the narrative found for both empathy and perspective taking should be highlighted. Because only a few minutes elapsed between the two tasks, the results suggest that watching the 360° video before the narrative helped to make the narrative more effective (i.e., the high scores on empathy and perspective taking after the narrative were probably due to the immersive experience).

An important component introduced in this study is the embodiment exercise at the beginning of the VR experience. Hence, the 360° video's potential to change empathy could be associated with embodiment with the victim and the sense of presence experienced. In fact, key variables of embodiment and sense of presence showed positive significant relationships with changes after both tasks—but the correlations in the narrative condition could be due to the carryover effect of the 360° video. Nevertheless, future studies should test this tentative explanation by using a between-subjects design.

A relevant limitation of 360° video is that it can produce sickness, as previous studies have discussed.<sup>36,37</sup> In this study, sickness may be caused by the movements of the camera. A possible solution would be to improve the resolution with an apparatus that could better fix the camera to the performer's head. However, our findings could also suggest that sickness may arise because of the psychological impact of feeling oneness with the victim.

Other limitations of this study should be noted. First, empathy, violent attitude, and perspective taking were evaluated with *ad hoc* questionnaires. Moreover, the low internal consistency of the ES and ATG-S questionnaires should be tested through exploratory factor analysis with

larger samples. Second, the results are only generalizable to young Mexican men who are motivated to participate in a research study. Although the findings are encouraging, considering the rates of violence toward women in Mexico,<sup>38</sup> they should be replicated in other populations. Third, the narrative task was slightly shorter than the 360° video, and the induction time might be a confounding variable. Moreover, future studies should include a control condition that only presents a 2D video, to isolate the immersive properties of the 360° video (vs. written text). Finally, there is no information about the maintenance of the laboratory results in the mid- and long term in the participants' daily life.

Despite its limitations, this study raises new possibilities in the prevention and treatment of SH toward women. Empathy, perspective taking, and sense of oneness could be target therapeutic components in interventions designed to decrease SH behaviors through a VR tool that is affordable for clinicians.

## Notes

- a. A within-subjects design was chosen to reduce the between-subjects variance or individual differences in the outcomes of the study. The inclusion and exclusion criteria for this study are not restrictive due to the novelty of using 360° video in the field of SH. Consequently, the individual differences in a between-subjects design could have confounded the outcomes of the study. Moreover, the only possible carryover effect in this study (i.e., dragging the experience of specific psychological outcomes after the first task to the second task) was controlled by counterbalancing the conditions, and it was also statistically analyzed.
- b. Machismo–Chivalry, Empathetic abilities, Alexithymia, and Social desirability will also be used in further secondary analyses. They are not included in this article because it focuses on testing the efficacy of the 360° video (vs. narrative) in changing specific outcomes. Nevertheless, secondary analyses are planned to examine the predictor effect of these variables on embodying a female avatar.
- c. The sample was recruited during a 3-month research stay by the first author in Mexico and, consequently, the resources and time for carrying out this proof-of-concept study were limited. To recruit as many participants as possible, we decided to carry out the recruitment from the first working day the laboratory setting was available until the last working day of the first author. Using G\*power v. 3.1.9.7,<sup>34</sup> we calculated a *post hoc* power analysis to find out if the study had enough power to detect effects greater than or equal to  $d=0.40$  for (1) an omnibus F-test “Repeated measures, within-between interaction” with two groups and three measurements; (2) an omnibus F-test “Repeated measures, within-between interaction” with two groups and two measurements; and (3) a *t*-test “Differences from constant (one sample case).” The power was calculated based on the total sample size ( $N=44$ ) and an effect size of  $f=0.20$ . We used this effect size because data in this field are limited, and  $d=0.40$  is a standard in psychology, according to Brysbaert.<sup>35</sup> Results indicated that this study had 82.29% power for the analysis of variance  $2 \times 3$ , 73.63% power for the analysis of variance  $2 \times 2$ , and 73.69% for the *t*-test to detect a medium effect size at  $p < 0.05$ .

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## Author Disclosure Statement

No competing financial interests exist.

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## Appendix

### Appendix A1

- 1) I am aware of how a woman feels when she is being harassed.
- 2) If I saw a woman alone on the street surrounded by men who were bothering her, I'd help her.
- 3) I am able to empathize with a woman who has suffered from gender-based violence.
- 4) Thinking about a woman who is a victim of gender-based violence gives me negative emotions.
- 5) I think I'm a person who understands women's feelings.

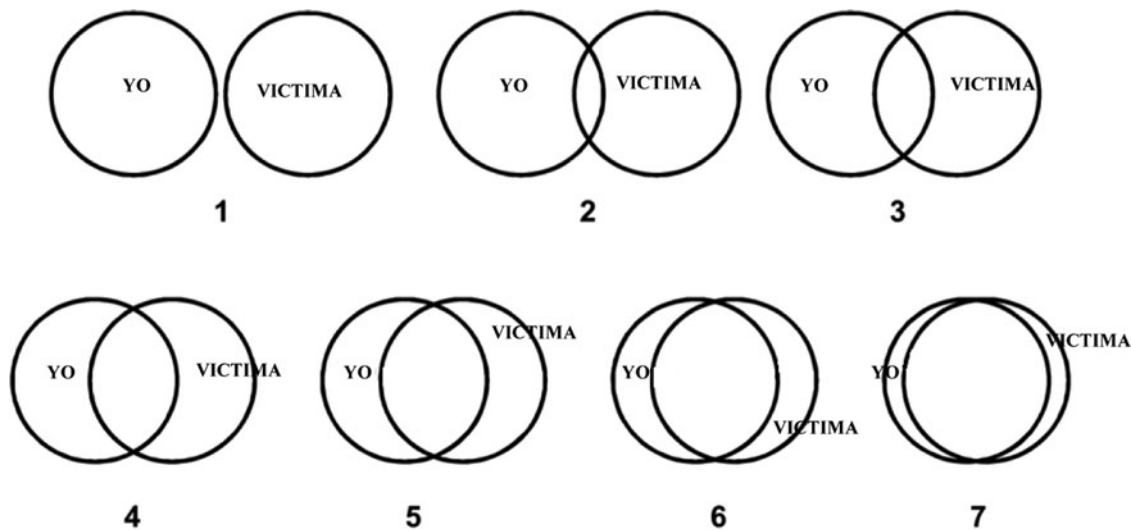
### Appendix A2

- 1) If a man hits a woman only once, it is not a problem.
- 2) Violent conduct is innate in man; it is part of his nature.
- 3) I believe that work should be done to prevent sexual harassment.
- 4) Some types of sexual harassment (e.g., street, political, school, etc.) are not violence.
- 5) Calling the attention (e.g., shouting, whistling, etc.) of the women on the street is a well-received practice among young people to be part of the group.

(Appendix continues →)



## Appendix A3



## Appendix A4

- 1) To what extent did you identify with the woman, the victim of harassment, during the experience?
- 2) To what extent did you see yourself from the perspective of the woman, the victim of harassment, and experience the situation as if you were her?
- 3) To what extent did you experience the situation as if it were real?
- 4) Did you ever feel that you were more vulnerable because the character that represented you in the narrative was a woman?
- 5) To what extent did you feel affectively involved with the feelings of the harassed woman?
- 6) Did you ever imagine how you would act if you really were a victim?
- 7) To what extent did you feel worried about what was happening to the woman?
- 8) To what extent did you understand the woman's emotions while she was being bullied?

## Appendix A5

- 1) I felt as if I were looking at myself. (*ownership*)
- 2) I experienced the arms of the performer as my own arms. (*ownership*)
- 3) I experienced the legs of the performer as my own legs. (*ownership*)
- 4) I experienced the body of the performer as my own body. (*ownership*)
- 5) I had the feeling that the virtual body belonged to me. (*ownership*)
- 6) I felt as if I had a female body. (*ownership*)
- 7) I had the illusion of sitting in the same place as the performer. (*location*)
- 8) I felt I had control over the arms of the performer. (*agency*)
- 9) I felt I had control over the legs of the performer. (*agency*)

- 10) I felt I had control over the body of the performer. (*agency*)
- 11) I felt as if I were there, inside the environment. (*presence*)
- 12) I was confused about whether the environment was real or not. (*presence*)
- 13) Now, when I think of the experience, I think of the environment more as a place I visited than as an image I saw. (*presence*)
- 14) During the experience, I felt nauseated. (*sickness*)
- 15) During the experience, I felt disoriented. (*sickness*)
- 16) During the experience, I felt dizzy. (*sickness*)

## Appendix A6

The first scenario is aimed to generate the sense of embodiment of the female victim's body, where participants follow the woman's body movements in the video (e.g., move their hands up and down, caress their limbs, and rotate their hands). This embody exercise was included in the study to induce the body-swap illusion, and to allow men participants to perceive themselves as women during the entire experiment (Fig. 1a). After the embodied induction, the video starts with some victim daily life activities (e.g., putting on her shoes, having breakfast, brushing her teeth, preparing her backpack for the university, etc.) (Fig. 1b). This scene was recorded to improve the participants' engagement with the future victim. Then, several harassment scenarios took place with the victim: a man tries to take a photograph of her without permission in the university library (Fig. 1c); a taxi driver carry out several sexual comments to the victim (Fig. 1d); the woman is victim of her husband, as the couple is having an aggressive discussion and the partner checks the girlfriend's mobile without her permission (Fig. 1e); and finally, a man looks at the victim when she is on the subway and tries to hold her hand (Fig. 1f). The video was edited by the Premiere Adobe program, uploaded on YouTube, and played on an iPhone6 with the VR option. The mobile was supported by a VR GLASS FOV: 120° to generate the VR immersion experience.