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Document Title: **Adaptation and Evaluation of Video Games to Reduce Sexual Violence on Campus**

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Document Number: **251937**

Date Received: **August 2018**

Award Number: **2014-VA-CX-0012**

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Final Report:
Adaptation and Evaluation of Video Games to Reduce Sexual Violence on Campus
Grant # 2014-VA-CX-0012

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July 23, 2018

This study was funded by the National Institute of Justice, Award No. 2014-VA-CX-0012. The opinions, findings, conclusions, and recommendations expressed in this document are those of the authors and do not necessarily reflect those of the Department of Justice. We would like to thank the student participants who gave their time during the game testing sessions and the law enforcement and victim services professionals who provided their insights for this study.

Abstract

During the fall of 2014, Prevention Innovations Research Center Directors, Sharyn Potter and Jane Stapleton, were awarded funding from the National Institute of Justice to develop a video game that could teach college students how to identify and intervene in situations where sexual violence is occurring or has the potential to occur. Over the course of 11 months, and with the help of undergraduate students from a variety of majors, two video games were conceptualized: (1) an adventure game and (2) a multiplayer trivia game to act as a precursor to the adventure game. Prototypes for the two games were then designed and tested between Fall 2015 and Fall 2017. During this period, approximately 738 undergraduate participants were involved in various aspects of the game testing, including providing focus group feedback and participating in a pilot study consisting of a pretest, posttest, and follow-up survey. Student input was invaluable to the success of the game prototypes. With participants' help, we concluded that gameplay shows promise as an effective way to introduce the concept of bystander intervention and increase bystander attitudes and efficacy in situations of sexual and relationship violence and stalking for first-year college students.

Purpose of the Project

Sexual assault is the most common violent crime committed on college campuses today.¹ One in five women have experienced a completed or attempted sexual assault as an undergraduate.² In one study, 28% of first-year college women experienced unwanted sexual contact and 7% experienced sexual assault or attempted sexual assault in the first semester of their first year of college, while 7% of college men reported an attempted or completed assault during their college experience.³ Growing evidence suggests the effectiveness of using online tools and video games for public health intervention and education.⁴⁻⁷ Because of the positive impact of these digital strategies, we saw a need to bring this research to sexual violence prevention, where there has been limited use of digital applications. The purpose of this project was to design and evaluate the pedagogical effectiveness and cost effectiveness of a video game to reduce sexual and relationship violence. It was hypothesized that the video game could enhance the self-confidence of male and female late adolescents (ages 18-24) to practice safe, appropriate, and effective approaches for intervening in situations where sexual and/or relationship violence (including stalking) is occurring, has the potential to occur, or recently occurred.

Project Participants

This project took place in four distinct phases. During Phase I, two game prototypes were designed through an ongoing collaboration between a workgroup of nine students at a mid-sized public university in New England (the project's home institution) and video game developers in a lab located at a nearby private college. Student workgroup members varied in ethnicity, gender, and fields of study and were recruited via campus flyers that advertised a paid,

yearlong opportunity to participate in a project to create a socially impactful video game. Following the creation of the trivia game prototype, it was evaluated via four focus group sessions with students who were unfamiliar with the project and attended a public university in New England that is much smaller than the project's home institution. These vetting sessions had an average of 6 participants in each session.

During Phase II, we conducted a total of 13 focus groups with 120 students (approximately 9 students per group) at the project's home institution, a mid-sized, public university in New England. We administered the first five focus groups to assess students' reactions to the trivia game prototype, and the remaining eight focus groups were administered to evaluate and improve the adventure game prototype. Participants were recruited via flyers posted throughout campus and a \$15 gift card for a choice of several national retail companies was offered as a participation incentive. Only students who were unaffiliated with the project and the initial workgroup were eligible to participate in the focus groups.

During Phase III (fall 2016), 305 first-year students at the project's home institution participated in 20 game testing sessions (approximately 15 people per session) in a pilot study to test both prototypes. All participants were at least 18 years of age, with 91% of participants being 18 years of age and 9% between 19 and 21 years old. Fifty percent of participants identified as female, 49% identified as male, and 1% identified as a non-binary gender. Most participants identified as white (89%), and 6.4% identified as Hispanic. Ninety-seven percent of students lived on campus. Students who participated in focus groups during Phase II and those who were members of the student workgroup in Phase I were ineligible to participate in the testing sessions as these sessions were only open to incoming first year students at the institution.

During Phase IV (fall 2017), we tested revised versions of the game prototypes at both a public and a private institution in New England. The public university was the project's home institution, while the private college was the home of the video game development lab with which we collaborated. Fourteen pilot study testing sessions were administered with 215 students at the public university, with an average of 13 participants per session. All public university participants lived on campus and were at least 18 years of age, with approximately 80% of participants being 18 years old. Approximately 49% of participants identified as female, 51% identified as male, and less than 1% of participants identified as a non-binary gender. Four pilot study sessions were administered with 88 students at the private institution, with an average of 22 participants per session. All private college participants were at least 18 years of age, with the vast majority being between 18 and 19 years old (59.1% = 18 years old; 31.8% = 19 years old; 9.1% = 20 years old or older). Approximately 44% of participants identified as female, 52% identified as male, and 3% identified as a non-binary gender. Eighty-five percent of participants lived on campus. All participants at both institutions agreed to be re-contacted at a later date. Upon re-contact via email, 68% of participants completed a follow-up survey. Any student who participated in previous phases of this project was ineligible to participate in Phase IV testing sessions.

Project Design, Methods, and Analyses

Research team members sought and obtained approval from the Institutional Review Board (IRB) for the Protection of Human Subjects in Research at the study's home institution and the NIJ for every study phase prior to its launch, to ensure that the study was in compliance with the protection of human subjects.

Phase I: Development and Initial Testing of Prototypes (February 2015-January 2016)

From February 2015 to January 2016, a workgroup of nine students at a mid-sized public university in New England were hired to participate in 90-minute bi-weekly meetings so that we could learn about their video game usage, the type of games they would want to play, when they prefer to play, and how they felt games might be used for teaching undergraduate students to intervene when they see sexual and relationship violence and stalking. The workgroup participants submitted and discussed their ideas, resulting in the decision to make two video games: (1) an adventure game and (2) a multiplayer trivia game to act as a precursor to the adventure game. Discussion sessions essentially consisted of brainstorming sessions, with students presenting their original ideas for the games or aspects of the games, followed by a discussion of whether the idea was true to college life, would engage college students, would be too obvious in its agenda, needed rewording, etc. Ideas were then revised as a group, with input from developers regarding what was feasible from a programming standpoint. At each build stage of the prototypes, the content of the games was again reviewed, discussed in a similar manner, and then further refined via workgroup consensus.

Throughout this period, game developers and researchers at a private college in New England collaborated with us once a month to create the trivia game prototype and solidify ideas and strategies for the adventure game prototype. Subsequent focus group sessions at a nearby small public university provided incredible insight into participant recruitment strategies that were used during later phases of the project. The overall feedback that we received on the trivia game prototype as the result of the focus groups was positive, and we were able to collect useful information on how players “learned” how to play a game and what features made a player

invest their time in the game. These features included ease of understanding the game objectives, player rewards (e.g., points, levels) and competitions between teams.

The trivia game was titled, “Mindflock” and was a multiplayer game incorporating both cooperation and competition. In the game, players sit in randomly assigned teams of two or three, answer trivia questions, and swap trivia categories to teammates who they believe may be more knowledgeable about a topic. Certain topics in the game could not be swapped, forcing individual players to try to answer the questions; such categories included sexual violence, relationship violence, and stalking. These questions were developed in a way to teach methods of bystander intervention, set social norms around positive bystander actions, and combat rape culture. At the end of each game round, the game was paused for a couple of minutes and teams in the room were ranked to encourage pride or “bragging rights” among winning team members. Participants in the workgroup believed that the trivia game could serve as a precursor to the adventure game, because it exposed players to information about sexual violence and associated methods for bystander intervention. Such information may be necessary prior to a role-playing game in which participants are put in situations to use those techniques. It also aimed to encourage a sense of pride in one’s knowledge about these issues through the use of competition.

The adventure game was titled, “Ship Happens” and was comprised of three worlds, each with its own storyline. In the game, players act out the explorations and decisions of the main character Zayek, who is on a space adventure with his alien companion, Bathazar. On each of his visits to the three planets, he is tasked with an overarching mission (e.g., getting into a VIP section at a show) that requires him to interact with various lifeforms on the planet, collect and give necessary items, and intervene in certain situations along the way. Some of these situations involve themes of sexual violence. Care was taken to create fantasy-based problematic situations

that mirrored versions of scenarios that a typical college student may encounter in their real lives. In addition, as the result of workshopping sessions, changes were made throughout the build of the final prototype that included giving the main character intervention options and language that were less direct in nature. Less direct intervention methods were seen as potentially more realistic, low-risk, and more comfortable options for a majority of college students.

Phase II: Second Prototype Testing at a Public Institution (February- July 2016)

From February to May, we administered a total of 13 focus groups with 120 students (approximately 9 students per group) at a mid-size public university in New England. The first five focus groups were administered in February and March to assess students' reactions to a revised version of the trivia game prototype. Participants enjoyed the game and provided feedback on ways to improve the player experience. They also provided insights into how we might successfully recruit first year students to a future pilot study. During this time, a prototype of the adventure game became ready for vetting. The final eight focus groups were administered beginning the last week of March to evaluate and improve the adventure game prototype. The day after each session, the principal investigator, the research assistant, and the game developer held a conference call to discuss technical issues that arose during the session and to create a list of changes that would need to be made for the focus group session the following week. This process continued through mid-May until the remaining eight focus groups were complete. The remainder of the summer was spent finalizing versions of the two video games based on the results of the focus groups and beginning development of a research plan to pilot test them.

Phase III: First Pilot Testing at a Public Institution (August 2016-November 2016)

A. Methods

In early August 2016, we completed a research plan to pilot the games for incoming first-year students at a mid-sized public institution in New England. We designed recruitment flyers and met with the residential life leadership team to strategize our recruitment, including determining the ideal times and locations for sessions, as well as the best ways to inform students of the opportunity to participate. We then posted flyers in the first-year residence halls and made a schedule of game testing sessions. From August 29th to October 1st, we administered the pilot study in the first-year residence halls. Students who participated in the study were randomized into one of three intervention conditions and a control condition. Participants in condition one played the trivia game; participants in condition two played the adventure game; participants in condition three played the trivia game followed by the adventure game; and participants in condition four (the control condition) played a trivia game without sexual assault and bystander intervention content. While participation in condition three (where students played both games) took approximately 65-75 minutes, participation in all of the other conditions took approximately 45-50 minutes. Participants in all four conditions provided informed consent, completed a pretest prior to the intervention, completed a posttest immediately following the intervention, and were debriefed. The researchers offered participants snacks that included pizza, chips, and soft drinks (the food was not purchased with NIJ funds and signs were posted to notify participants) throughout the sessions and provided each participant with a \$10 gift card (Amazon or university-specific) at the end of the session, as an incentive for their participation. Participants who consented to provide their campus e-mail address were sent a follow-up survey four weeks later and were offered a \$20 gift card as an incentive to complete it. We completed our initial data collection on October 1st and collected follow-up data through November 6th.

B. Analyses

The collected data was analyzed and informed any additional changes that were made to the games for Phase IV. The Bystander Attitude Composite Scale and the Bystander Efficacy Scale were used to measure change from pre- to post-test. The Bystander Attitude Composite Scale is a 16-item scale that indicates an individual's intent to help using bystander intervention.⁸ The Bystander Efficacy Scale is an 18-item scale that measures participants' confidence in performing bystander interventions.^{9,10} The findings, which are described below and are outlined in Tables 1 and 2, are from an article that was recently accepted for publication in the *Games for Health Journal* and is now "in press".¹¹

There were no significant differences between the bystander attitude and bystander efficacy pretest scores for male or female participants in all four conditions. Male participants' bystander attitudes significantly increased between the pretest ($M = 3.9; p < .001$) and follow-up survey ($M = 4.2$) in the adventure-only condition. Male participants in the other three conditions showed no significant changes in bystander attitude scores over time. Female participants' bystander attitudes also significantly increased between the pretest ($M = 3.8; p < .05$) and follow-up survey ($M = 3.9$); however, this was only true for those in the condition that played both games. Female participants in the other three conditions showed no significant changes in bystander attitude scores over time.

Similar to bystander attitude scores, male participants' bystander efficacy scores significantly increased between the pretest ($M = 8.9; p < .05$) and follow-up survey ($M = 9.1$) in the adventure-only condition, but also between the pretest ($M = 8.9; p < .01$) and follow-up ($M = 9.2$) surveys in the trivia-only condition, indicating a sustained impact of both interventions. For female participants, bystander efficacy scores increased from the pretest ($M = 9.1; p < .05$) to

posttest ($M = 9.2$) in the trivia-only condition. Unfortunately, female participants in the condition with both games significantly decreased in their bystander efficacy from the pretest ($M = 9.0$; $p < .01$) to follow-up ($M = 8.1$). This finding is likely the result of a lengthy testing session that frustrated participants. Male participants' mean bystander efficacy scores in the condition with both games also decreased from pretest ($M = 8.9$) to follow-up ($M = 8.1$), but this change did not reach a level of significance. Due to this finding, in the second pilot study (Phase IV), we removed the condition where participants played both games, resulting in only three conditions: trivia-only, adventure-only, and the control condition.

Following quantitative and qualitative analyses, the games were revised to provide a more user-friendly experience for the Phase IV testing. Questions were removed from the trivia game that students felt were boring or overly difficult, game rounds were made shorter to provide more fast-paced, competitive gameplay, and the adventure game gained additional interactive elements, allowing players to feel more in control of the story. An introductory video was also added to the adventure game to better frame the characters and storyline. Results also indicated that study participants were more likely to intervene if the intervention offered to the player was subtle. Therefore, portions of the adventure game were revised to include interventions that were less direct in their approach. For example, in one scene, the main character of the adventure game listens to a cashier talk about a boyfriend who refuses to stop calling her. In the Phase III iteration of the game, he has the option to hand her a RAINN flyer, mention the support line, and say that she should call them. In the Phase IV version of the game, this option was changed to simply handing her the RAINN flyer and asking her if she could recycle it for him. In the revised version, he is able to provide her with the same information in a way that might be more comfortable for both parties. Further, based on student feedback, game

testing sessions were also made shorter and games were tested separately. In other words, it was determined that the third condition, which included both the trivia and adventure games, should be removed for Phase IV.

Phase IV: Second Pilot Testing Phase at a Public and Private Institution (August 2017-December 2017)

A. Methods

In this phase, we piloted the revised games at a public and a private institution in New England. Fourteen pilot study sessions were administered with 215 students at the public university, with an average of 13 participants per session. Four pilot study sessions were run with 88 students at the private institution, with an average of 22 participants per session. Based on results from the first pilot study (Phase III), participants in this pilot test were randomly assigned to one of three conditions: trivia, adventure, and the control group.

Recruitment of first-year and second-year students aged 18 years or older at the private college began in August 2017. At the private institution, we recruited for the four sessions with the assistance of the college's Student Wellness Center staff who distributed recruitment emails and flyers to the residence hall directors and undergraduate advisors to give to students. Students signed up for the sessions online using Qualtrics. Interested participants were instructed to bring their laptop to the session and accessed games via a flash drive. The duration of each session was approximately one hour. After signing the consent form, students completed an online pretest, played one of the game prototypes, completed an online posttest, received a debriefing form, and were then given a \$10 Amazon gift card. Two volunteers from the study's home institution and a volunteer from the video game lab housed at the private institution attended

each session. Participants who agreed to be re-contacted were emailed a link for a follow-up survey four weeks later (they were routed to a different survey link that it was not connected to their name or other identifying information, so that their anonymity was ensured). Participants were offered a \$20 Amazon gift card as an incentive to complete the follow-up. All participants agreed to be re-contacted and 68% completed the follow-up survey.

Following the sessions held at the private college, several organizations at the study's home institution (public university) were coordinated with to arrange additional testing sessions. Recruitment strategies included meeting with the Interfraternity Council on campus and establishing a contest for fraternities and sororities to recruit participants, as well as collaborating with a university organization designed to promote research experience for first-year business and economics students. Strategies resulted in varying levels of success. Following recruitment, testing sessions were administered at the public university using the same methodology as the private college. One exception was that students at the public university were offered a choice of incentives from either a \$10 Amazon gift card or a university-specific gift card.

B. Analyses

In December, we began merging and coding the 2017 data. The collected data was later analyzed to examine changes in bystander attitudes and bystander efficacy scores over the three time points (i.e., pre-test, post-test, follow-up) for each condition (i.e., control, trivia, adventure). Any differences between participant gender were also examined. Mean composite scores for bystander attitudes and bystander efficacy are outlined in Table 3. Of note, the findings described below did not differ by school or when controlling for a participants' exposure to information on sexual violence or bystander intervention prior to entering college.

Bystander Attitudes

Findings related to changes in bystander attitude scores are presented in Table 4. While there was no significant interaction effect between condition and time on bystander attitude scores, planned comparisons of changes in mean scores over time by condition were run. In the control and trivia conditions, bystander attitude means were almost identically significantly higher ($p < .05$) at post-test (control = 4.19; trivia = 4.19) than they were at pre-test (control = 4.09; trivia = 4.09). While there were no significant differences between post-test and follow-up (control = 4.20; trivia = 4.18) in either condition, there were also no significant differences between pre-test and follow-up. Findings suggest that although changes in scores were partly sustained at follow-up, there was likely a great deal of individual variability in the maintenance of increased bystander attitudes over time in the control and trivia conditions. The adventure condition showed the most significant changes in bystander attitude scores over time, with mean scores being significantly higher ($p < .001$) at post-test ($M = 4.27$) than they were at pre-test ($M = 4.06$), and significantly lower ($p < .01$) at follow-up ($M = 4.13$) than they were at post-test. Bystander attitude scores in the adventure condition were also not significantly different between pre-test and follow-up ($p = .407$), indicating that changes in scores were not fully maintained over time.

Bystander attitude means were overall significantly higher for women ($M = 4.27$) than they were for men ($M = 4.04$). Planned comparisons revealed that significant gender differences within the trivia condition (men = 3.94; women = 4.36; $p < .001$) appeared to contribute to this effect, as overall gender differences in the control ($p = .116$) and adventure conditions ($p = .328$) failed to reach significance. While there was no overall significant interaction effect between condition and gender on bystander attitudes over time, planned comparisons revealed several patterns of significance.

In the control condition, only men showed significant changes in bystander attitudes over time, both between the pre- and post-test ($p < .01$), and between the pre-test and follow-up ($p < .05$). Men's bystander attitudes were higher at post-test ($M = 4.13$) than they were at pre-test ($M = 3.95$), and there were no significant changes in mean scores from post-test to follow-up ($M = 4.13$). These differences indicate that men's bystander attitudes within the control condition not only increased, despite receiving no intervention, but were sustained over time. It is possible that these changes represent a mere exposure effect. In contrast, women in the control condition demonstrated no significant differences between pre-test ($M = 4.23$), post-test ($M = 4.26$), and follow-up ($M = 4.26$) measures of bystander attitudes scores.

When analyses were run separately by gender, participating in the trivia condition no longer had any significant effect on bystander attitude scores. While increases in men's scores from pre-test to post-test within the trivia condition were much closer to reaching a level of statistical significance ($p = .084$) than women's scores ($p = .606$), neither men (pre-test = 3.84; post-test = 3.97; follow-up = 4.00) nor women (pre-test = 4.33; post-test = 4.40; follow-up = 4.36) achieved any significant changes in bystander attitudes across the three time points.

In the adventure condition, both men ($p < .01$) and women ($p < .001$) showed significant increases in bystander attitudes from pre-test (men = 4.04; women = 4.08) to post-test (men = 4.22; women = 4.33). However, while men's bystander attitudes significantly decreased ($p < .01$) from post-test to follow-up ($M = 4.05$), the decrease in women's bystander attitudes at follow-up was not statistically significant ($M = 4.21$; $p = .141$). Although it appears that women's changes in bystander attitudes were more sustained over time than they were for men, there were no significant differences between pre-test and follow-up scores for men ($p = 1.00$) nor women ($p = .196$).

Bystander Efficacy

Findings related to changes in bystander efficacy scores are presented in Table 5. While there was no significant interaction effect between condition and time on bystander efficacy scores, planned comparisons of changes in mean scores over time by condition revealed that bystander efficacy means were significantly higher ($p < .001$) at post-test (control = 9.42; trivia = 9.39; adventure = 9.41) than they were at pre-test (control = 8.96; trivia = 8.96; adventure = 8.74) for all three conditions. Bystander efficacy means were also significantly lower at follow-up (control = 8.88; trivia = 8.97; adventure = 9.06) than they were at post-test across conditions, though the level of significance for these changes differed by condition (control and trivia conditions $p < .01$; adventure condition $p < .05$). Differences in bystander efficacy scores between pre-test and follow-up failed to reach significance for each condition, indicating that increases in bystander efficacy were not sustained over time.

Planned comparisons were also run to examine bystander efficacy scores by gender. In the control condition, significant changes in bystander efficacy scores for men were only seen from post-test to follow-up ($p < .05$); there was no significant change from pre-test to post-test ($p = .077$), though their mean scores did increase (pre-test = 9.05; post-test = 9.42; follow-up = 8.81). It is unclear why male participants' bystander efficacy scores significantly decreased at follow-up given that they did not receive an intervention, but it may speak to a social desirability bias related to administration setting. The opposite was true for female participants in the control condition. Women's bystander efficacy scores changed significantly from pre-test to post-test ($p < .01$), but not from post-test to follow-up ($p = .086$). Despite it being the control condition, women's scores increased from pre-test ($M = 8.87$) to post-test ($M = 9.42$), and were at least somewhat sustained at follow-up ($M = 8.94$). While it's unclear why these increases from pre- to

post-test occurred for women in the control condition, it's possible that they were the result of a priming effect.

In the trivia condition, both men ($p < .05$) and women ($p < .01$) showed significant changes in bystander efficacy scores from pre-test to post-test, but not from post-test to follow-up, suggesting that changes were partly sustained over time. Men's scores increased significantly from pre-test ($M = 8.82$) to post-test ($M = 9.25$), and decreased at follow-up ($M = 8.81$), though the decrease failed to reach significance ($p = .125$). While women's increases in bystander efficacy scores from pre-test ($M = 9.08$) to post-test ($M = 9.54$) were more significant than men's increases, the decrease in women's scores at follow-up ($M = 9.13$) were closer to reaching a level of significance ($p = .066$), suggesting that they were less sustained over time than they were for male participants.

Participants in the adventure condition showed the greatest significant increases in bystander efficacy scores from pre-test to post-test out of the three conditions, regardless of gender ($p < .001$). However, changes in bystander efficacy from post-test to follow-up were only significant for male participants ($p < .01$); female participants showed no significant statistical changes from post-test to follow-up ($p = 1.00$). Male participants in the adventure condition had bystander efficacy scores that significantly increased from pre-test ($M = 8.95$) to post-test ($M = 9.55$), and significantly decreased at follow-up ($M = 9.01$), indicating that the changes were not sustained over time. Conversely, female participants' scores significantly increased from pre-test ($M = 8.52$) to post-test ($M = 9.27$), but did not significantly decrease at follow-up ($M = 9.11$), indicating that changes were relatively stable over time. In fact, upon examination of each gender assigned to each condition, only females in the adventure condition showed a significant increase in bystander efficacy scores between pre-test and follow-up ($p < .05$).

Implications for Criminal Justice Policy and Practice in the United States

Findings suggest that trivia and adventure games may increase players' awareness of sexual and relationship violence and stalking and introduce active bystander skills that they can choose to employ later in their everyday lives. However, future research is necessary to further delineate and strengthen these findings. The trivia game, ultimately named *Mindflock*, aimed to accomplish the above goals by presenting relevant facts, statistics, information, and historical examples. The interactive adventure game, named *Ship Happens*, utilized a video game platform that presented college life scenarios and asked players to make decisions that determine how the narrative will unfold. The games were developed by a workgroup of students who were recruited not because of their interest in ending sexual violence, but due to their interest in developing a video game to teach their peers about college social life. The workgroup aimed to make a game that was not just educational, but would be fun and engaging for their peers. This iterative use of the target audience in the development of an educational game is particularly unique to this study and is a method that should be further explored and refined.

The preliminary results from the pilot studies suggest that video games may be a useful platform to deliver information to college students about sexual violence and increase their knowledge about ways to intervene. These findings were demonstrated through some increases in participants' bystander attitudes and bystander efficacy scores at two time points, directly following playing the games and at a 4-week follow-up. However, it is important to note that the patterns of changes over time were not consistent across the two phases of pilot testing. While Phase III showed sustained increases in scores over time, Phase IV suggested that changes are not always sustained in the long-term. Further, while the results of Phase III suggested that games may be a particularly important mechanism to engage men in sexual violence prevention

and response efforts, findings from Phase IV of the project revealed that games may be just as important for women or there may be a more complex relationship with gender that requires further testing. More research is needed to examine how the impact of these interventions can be made more lasting and to explore how gender may be connected to the successful implementation of games for prevention programming.

To our knowledge, there has been no scientific research to investigate the effectiveness of online sexual and interpersonal violence prevention approaches. The research supported by this grant shows that online educational video games that give first-year undergraduate students an opportunity to learn about sexual violence and practice intervening as a bystander may be one component of a comprehensive prevention plan that makes the best use of available technologies. The findings of this study may be particularly useful to colleges and universities that are seeking creative solutions to meet prevention requirements imposed by Title IX and the Campus SaVE Act, while also appealing to college students' interests and increasing engagement levels during prevention programming. Findings from our research provide academic researchers, health officials, and college administrators with insight into students' reactions to public health messages when they are conveyed using video games, important information for those working to reduce violence on campus.

This research also highlights the challenge in recruiting and engaging students in prevention efforts when these programs are not mandated by the institution. Despite providing students with a \$10 gift card for a one-hour session and the promise of an additional \$20 gift card to complete a 15-minute follow-up survey, it was challenging to recruit students for both pilot studies. Further, in the first pilot study (Phase III), students who were randomly assigned to the condition with both games had lower bystander efficacy scores at posttest time than at pretest

time, as a result of their frustration over participating in a longer session than peers who were assigned to a one-game condition. Pilot testing has revealed several opportunities to improve game playability and quality. Moving forward, we will continue to make improvements and assess which aspects of the games are the most effective. In the future, we hope to share new and improved versions of these games with similar institutions across the United States to reduce violence and improve campus safety.

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Table 1*Phase III Mean Composite Scores for Bystander Attitudes & Efficacy Outcomes*

Condition	Bystander Attitudes			Bystander Efficacy		
	<i>Overall</i>	<i>Men</i>	<i>Women</i>	<i>Overall</i>	<i>Men</i>	<i>Women</i>
<u>Control</u>						
<i>Pre-Test</i>	4.0	3.7	4.2	8.9	8.6	9.2
<i>Post-Test</i>	4.1	3.9	4.3	9.3	9.0	9.6
<i>Follow-Up</i>	3.9	3.6	4.2	9.0	8.3	9.5
<u>Trivia</u>						
<i>Pre-Test</i>	3.9	3.9	4.0	9.0	8.9	9.1
<i>Post-Test</i>	4.1	4.0	4.2	9.2	9.2	9.2
<i>Follow-Up</i>	4.1	3.9	4.2	9.3	9.2	9.3
<u>Adventure</u>						
<i>Pre-Test</i>	4.1	3.9	4.2	9.1	8.9	9.2
<i>Post-Test</i>	4.3	4.1	4.4	9.7	9.5	9.9
<i>Follow-Up</i>	4.3	4.2	4.4	9.3	9.1	9.4
<u>Both Games</u>						
<i>Pre-Test</i>	3.8	3.8	3.8	8.9	8.9	9.0

<i>Post-Test</i>	4.1	4.0	4.1	9.2	9.0	9.5
<i>Follow-Up</i>	3.8	3.6	3.9	8.1	8.1	8.1

Table 2

Phase III Mean Differences for both Bystander Outcome Variables over Time

Condition	Attitudes		Efficacy	
	<i>Pre-Test to Post-Test</i>	<i>Pre-Test to Follow-Up</i>	<i>Pre-Test to Post-Test</i>	<i>Pre-Test to Follow-Up</i>
Control	-0.1	0.1	-0.4	-0.1
<i>Men</i>	-0.2	0.1	-0.4	0.3
<i>Women</i>	-0.1	0.0	-0.4	-0.3
Trivia	-0.2	-0.2	-0.2	-0.3
<i>Men</i>	-0.1	0.0*	-0.3	-0.3**
<i>Women</i>	-0.2	-0.2	-0.1*	-0.2
Adventure	-0.2	-0.2**	-0.6	-0.2
<i>Men</i>	-0.2	-0.3***	-0.6	-0.2*
<i>Women</i>	-0.2	-0.2	-0.7	-0.2
Both Games	-0.3	0.0	-0.3	0.8**
<i>Men</i>	-0.2	0.2	-0.1	0.8
<i>Women</i>	-0.3	-0.1*	-0.5	0.9**

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

Table 3

Phase IV Mean Composite Scores for Bystander Attitudes & Efficacy Outcomes

Condition	Bystander Attitudes			Bystander Efficacy		
	<i>Overall</i>	<i>Men</i>	<i>Women</i>	<i>Overall</i>	<i>Men</i>	<i>Women</i>
<u>Control</u>						
<i>Pre-Test</i>	4.09	3.95	4.23	8.96	9.05	8.87
<i>Post-Test</i>	4.19	4.13	4.26	9.42	9.42	9.42
<i>Follow-Up</i>	4.20	4.13	4.26	8.88	8.81	8.94
<u>Trivia</u>						
<i>Pre-Test</i>	4.09	3.84	4.33	8.95	8.82	9.08
<i>Post-Test</i>	4.19	3.97	4.40	9.39	9.25	9.54
<i>Follow-Up</i>	4.18	4.00	4.36	8.97	8.81	9.13
<u>Adventure</u>						

<i>Pre-Test</i>	4.06	4.04	4.08	8.74	8.95	8.52
<i>Post-Test</i>	4.27	4.22	4.33	9.41	9.55	9.27
<i>Follow-Up</i>	4.13	4.05	4.21	9.06	9.01	9.11

Table 4

Phase IV Planned Comparisons for Changes in Bystander Attitudes over Time

Condition	Mean Difference		
	<i>Pre-Test to Post-Test</i>	<i>Post-Test to Follow-Up</i>	<i>Pre-Test to Follow-Up</i>
Control	-0.11*	-0.00	-0.11
<i>Men</i>	-0.18**	0.00	-0.18*
<i>Women</i>	-0.03	-0.00	-0.03
Trivia	-0.10*	0.00	-0.09
<i>Men</i>	-0.13	-0.03	-0.16
<i>Women</i>	-0.06	0.04	-0.03
Adventure	-0.21***	0.14**	-0.07
<i>Men</i>	-0.18**	0.17**	-0.01
<i>Women</i>	-0.25***	0.12	-0.13

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

Table 5

Phase IV Planned Comparisons for Changes in Bystander Efficacy over Time

Condition	Mean Difference		
	<i>Pre-Test to Post-Test</i>	<i>Post-Test to Follow-Up</i>	<i>Pre-Test to Follow-Up</i>
Control	-0.46***	0.54**	0.08
<i>Men</i>	-0.37	0.61*	0.23
<i>Women</i>	-0.55**	0.48	-0.07
Trivia	-0.44***	0.43**	-0.02
<i>Men</i>	-0.43*	0.44	0.01
<i>Women</i>	-0.46**	0.41	-0.04
Adventure	-0.67***	0.35*	-0.33
<i>Men</i>	-0.60***	0.55**	-0.05
<i>Women</i>	-0.75***	0.15	-0.60*

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