# Evaluating the *Whoops Proof S.C.* Campaign: A Pair-Matched Group Pretest–Posttest Quasi-experimental Study

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## Abstract

*Introduction*: In South Carolina, 50% of all pregnancies are unintended. Intrauterine devices (IUDs) and the implant are recommended as top-tier contraceptive options for all women and adolescents. The Whoops Proof S.C. campaign was evaluated to determine if women (ages 18 to 29) who do not intend to become pregnant in the next year report greater awareness of and positive regard for IUDs and the implant after exposure to a multi-channel campaign. *Methods*: A pair-matched group pretest–posttest quasi-experimental design was utilized. A total of 1,439 women responded to the pretest survey (May–July 2016) and 1,534 responded to the posttest survey (October–November 2016) in four South Carolina counties. Statistical analysis include paired-sample and independent t-tests and one-way ANOVA tests for variance. *Results*: At posttest, intervention county participants were significantly more likely to recall messaging and to report receiving contraceptive information from *Whoops Proof S.C* (t(1533)=− 8.466, p < .0001). Participants who saw ads more than once per week reported a significant increase in awareness of IUDs and the implant (F(6,1532)=5.571; p < .001). Participants in intervention counties reported a significant increase in positive attitudes toward IUDs (t(616)=− 1.740; p=.041) and the implant (t(603)=− 1.665; p=.048). *Discussion*: The *Whoops Proof S.C*. campaign offers strategies to campaign planners and health care providers to optimize exposure and recall frequency to increase awareness of and positive regard for highly effective contraceptive methods. Campaign planners should test messages and focus on communication channels to increase engagement and avoid saturation.

**Keywords** Quasi-experimental design · Long-acting reversible contraception · Birth control · Communication

## Significance

The current, original study provides knowledge to campaign planners to conduct a pair-matched group pretest–posttest quasi-experimental study. Nearly half of all pregnancies in the U.S. are unintended. Long-acting reversible contraceptive methods, including IUDs and the implant, hold the potential to reduce unintended pregnancies. The *Whoops Proof S.C*. campaign offers health communication strategies to optimize exposure and recall frequency of campaign messages to increase awareness of and positive regard for highly effective long-acting reversible contraceptive methods. Findings suggest campaign planners should test messages and focus on communication channels to increase engagement and avoid saturation by rotating and refreshing messages.

## Introduction

Nearly half (45%) of pregnancies in the United States are unintended (Finer and Zolna 2016). Unintended and mistimed pregnancies result in negative social and health outcomes for women, families, and communities (Guttmacher Institute 2013; Khajehpour et al. 2013). Women with unintended pregnancies face an increased risk of delivering preterm and low birth weight babies (Finer and Zolna 2016; Khajehpour et al. 2013). The burden of unintended pregnancy may result in personal and professional barriers for women, such as being unable to pursue employment or

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higher levels of education (Finer and Zolna 2016; Gipson et al. 2008; Schwarz et al. 2008).

Although unintended pregnancies have declined since 2008, these rates remain high for certain populations including low-income women, women ages 18–24, cohabiting women, women with lower educational attainment (i.e., less than a high school diploma) and women in certain racial/ethnic groups (i.e., Black and Hispanic). Further, mainline Protestants and women with no religious affiliations also reported higher rates of unintended pregnancies between 2008 and 2011 (Finer and Zolna 2016). Reasons for increased rates of unintended pregnancies vary greatly by subpopulations. Research suggests cohabiting women maintain regular sexual activity, thus increasing their risk of unintended pregnancy (Finer and Zolna 2011). Unintended pregnancy among women with no religious affiliation may reflect recent trends of contraceptive acceptance among religious women (Jones and Dreweke 2016). Additionally, low-income women often practice inconsistent contraceptive use, contributing to unintended pregnancy (Frost et al. 2007).

Half of all unintended pregnancies result from incorrect or inconsistent contraceptive use (Winner et al. 2012). Long-acting reversible contraceptive (LARC) options, including IUDs and the implant, offer highly effective methods to reduce unintended pregnancies (Trussell et al. 2013). The American College of Obstetrician and Gynecologists (ACOG) recommend LARC methods as first-line contraceptive options for all women and adolescents (ACOG 2015). LARC methods have a failure rate of less than 1% for typical and perfect use (ACOG 2015; Guttmacher Institute 2015b; Winner et al. 2012). LARC methods reduce the risk of user error and offer increased effectiveness compared to daily methods because they are placed by clinicians (Winner et al. 2012). Studies confirm that LARC methods are safe (ACOG 2015; Brucker et al. 2008; Gilliam et al. 2010; Stoddard et al. 2011) and offer high continuation and satisfaction rates among users (ACOG 2015; Stoddard et al. 2011).

LARC usage has increased modestly in recent years from 2.4% of contraceptive users in 2002 to 11.6% in 2013 (Finer and Zolna 2016; Guttmacher Institute 2015a). Uptake of these highly effective methods in the U.S. continues to lag behind other developed countries that also report lower rates of unintended pregnancies (Bajos et al. 2003; Moreau et al. 2014). Women may reject LARC methods due to lack of knowledge and awareness (Eisenberg et al. 2012; Spies et al. 2010), misinformation (Black et al. 2012; Russo et al. 2013), and perceived lack of safety (Russo et al. 2013; Sundstrom et al. 2015). Communication research found that women recalled negative misinformation about the IUD in conversations with valued members of their social networks (Anderson et al. 2014; Sundstrom et al. 2015). Communication

campaigns have been successful in changing attitudes and behaviors related to health. In the U.S., contraceptive access and communication campaigns have resulted in higher rates of LARC use regionally (Keefe 2012; Secura et al. 2011).

## Whoops Proof S.C.

In South Carolina, 50% of all pregnancies are unintended (Guttmacher Institute 2015b). The *Whoops Proof* communication campaign was designed to increase women's awareness of and positive regard for IUDs and the implant. A national nonprofit organization partnered with a human-centered design and innovation firm to conduct formative audience research and message testing to create a consumer-facing health communication campaign. Researchers conducted focus groups with 70 women ages 18–29 to design and test messages, resulting in a campaign that is grounded in the views, experiences, and words of young women. The *Whoops Proof* Campaign was made available to a local nonprofit organization in South Carolina. A local brand marketing firm implemented the *Whoops Proof S.C.* multi-channel messaging campaign (July–October 2016). To position the campaign as a localized effort, the brand *Whoops Proof S.C.* was established to raise awareness about IUDs and the implant. All creative, with the exception of a new :30 s radio spot written for the campaign, was sourced from the *Whoops Proof* campaign. The campaign's only call-to-action across all media channels was an offer to learn more at the WhoopsProof.org/SC microsite.

The media plan directed 70% of the budget to digital and social media tactics, and the remaining 30% was directed toward traditional media tactics. All media channels were strategically selected to target women ages 18–29. Digital and social media channels included desktop web banner ads, geo-mobile web banner ads, search engine ads on Google/Yahoo/Bing, Facebook ads, Instagram ads, Twitter ads, Pandora digital radio ads, and Spotify digital radio ads. Traditional media included local FM radio ads (with streaming digital value added where available) and college campaign newspaper print ads. A process evaluation indicated that the campaign's length, budget, and advertising media resulted in strong saturation. Specifically, the campaign resulted in 7 million total impressions, 50,000 clicks, and 20,465 users (approximately 43% of the target population) (see Table 1). Facebook emerged as the most cost-effective platform with a cost-per-click (CPC) rate of $0.21 (compared to the U.S. national average of $0.27) and a 3.05% click through rate (compared to 0.9% nationally) (see Table 2).

**Table 1** Campaign dose key performance indicators

| Digital media | Impressions | Clicks | Reach |
|---|---|---|---|
| Social networks | 1,975,922 | 41,086 | 50,325 |
| Web/mobile displays | 4,003,164 | 7549 | – |
| Web search engines | 4711 | 65 | – |
| Digital radio | 1,005,746 | 5373 | 27,275 |
| Traditional media | Impressions | Reach | Frequency |
| College campus print | 15,000 | 15,000 | 1 |
| Traditional FM radio | 80,438 | 15,177 | 5 |
| Campaign dose | Campaign totals | | |
| Total campaign impressions | 7,084,981 | | |
| Ideal impressions reach (% of target pop.) | 100% of target | | |
| Ideal impressions frequency | 149 × impressions per F18–29 | | |
| Total website users | 20,465 | | |
| Total website users (% of target pop.) | 43% | | |

All figures represent best possible estimates from available sampled data

**Table 2** Digital media performance by channel

| Digital media channel | Clicks | Click through rate (CTR) (%) | Cost-per-click (CPC) |
|---|---|---|---|
| Facebook | 36,085 | 3.05 | $0.21 |
| Instagram | 1624 | 0.33 | $2.98 |
| Twitter | 3213 | 0.98 | $0.89 |
| Geo-mobile web banners | 3646 | 0.19 | $1.92 |
| Desktop web banners | 3881 | 0.16 | $1.80 |
| Search engine ads | 171 | 1.54 | $7.19 |
| Spotify | 111 | 0.13 | $45.04 |
| Pandora | 5373 | 0.53 | $2.66 |

## Purpose

The purpose of this study was to evaluate the impact of the *Whoops Proof S.C.* campaign to increase awareness of and positive regard for IUDs and the implant among women ages 18 to 29 who do not intend to become pregnant in the next year. The study implemented a pair-matched group pretest–posttest quasi-experimental design with two intervention and two comparison counties in South Carolina. The primary outcomes included awareness of and attitudes toward IUDs and the implant.

## Hypotheses

Researchers hypothesized that women in intervention counties will:

(**H1**) be more aware of *Whoops Proof S.C.* at the end of the campaign than women in the comparison counties.

(**H2**) report increased awareness of IUDs and the implant.

(**H3**) report more positive attitudes toward IUDs and the implant.

(**H4**) be more likely to recall seeing or hearing messages about IUDs and the implant than women in the comparison counties.

Those who recall the top four messages will:

(**H4a**) report increased awareness of IUDs and the implant.

(**H4ai**) express more positive attitudes toward IUDs and the implant.

(**H5**) Increased exposure to the campaign will have a positive impact on the variables described in H4a and H4ai.

## Method

To measure the impact of the *Whoops Proof S.C.* campaign, a pair-matched group pretest–posttest quasi-experimental design was utilized. The matching was conducted at the level of the county (i.e., group). Scholars suggest that this type of pair-matched study design may address threats to validity due to lack of randomization (West et al. 2008). Similar pair-matched pretest–posttest research designs have been used to test the effectiveness of health communication campaigns on issues such as obesity prevention (LaCaille et al. 2016), walking among older adults (Reger et al. 2002), and sun safety (Andersen et al. 2008).

## County Selection

A collaboration of community partners assessed supply-side characteristics of counties in South Carolina to determine intervention counties. The following safety net site selection

**Table 3** Variable data for county matching

| County | Population | Poverty level[a] (%) | Racial composition[b] (%) | Housing units |
|---|---|---|---|---|
| Intervention 1 | 288,728 | 18.30 | 20.70 | 123,396 |
| Comparison 1 | 365,674 | 18.10 | 28.90 | 197,820 |
| Intervention 2 | 283,280 | 18.90 | 13.80 | 189,111 |
| Comparison 2 | 270,263 | 14.30 | 14.30 | 116,357 |

[a]Percentage of people whose income in the past 12 months is below the poverty level

[b]Percentage African American

criteria were used: clinical providers trained in the insertion of IUDs and the implant; clinics up-to-date on best practices for contraceptive care (i.e., Quickstart and providing IUDs to teens and nulliparous women); clinics offering the full range of contraceptive options; leadership buy-in for contraceptive care and access. Although increased uptake was not an objective of *Whoops Proof S.C.*, it was prudent and ethical to test the campaign in locations where the infrastructure of local clinics was prepared to provide an ideal patient experience, in the event demand for IUDs and the implant increased.

Researchers identified the following matching variables to pair-match intervention with comparison counties: size (population); poverty (percentage of people whose income in the past 12 months is below the poverty level); racial composition; housing units (see Table 3). Based on these matching variables, the two intervention counties were matched respectively with one other county. Choosing pair-matched counties within the same state is an advantage of this evaluation, however, researchers addressed the potential for contamination. First, researchers eliminated any potential comparison counties that shared a border with the intervention counties. To limit contamination across county lines, the local brand marketing firm employed a digital ad vendor to disseminate ads using advanced geo-targeting, which restricts messages to specific zip codes. In addition, the marketing firm conducted continuous web analytics to track geo fences and website traffic to the microsite based on geographic location. Finally, the pair-matched pretest–posttest study design allowed researchers to measure the extent to which contamination occurred by including questions about campaign messages and the source of those messages.

## Participant Recruitment

Researchers recruited women in the target counties ages 18–29, who were not pregnant or interested in becoming pregnant within the next year. Since research shows that sexual minority women (i.e., lesbian, bisexual, and pansexual/

queer) remain at higher risk for mistimed or unintended pregnancies and are more likely to desire pregnancy prevention information compared to their heterosexual counterparts (Blunt-Vinti et al. 2018; Everett et al. 2017; Goldberg et al. 2016), the study sample included participants of all sexual identities and sexual relationship histories. In order to avoid issues of attrition, researchers employed a cross-sectional web-based survey. A priori power analysis computed estimated sample size to be approximately 315 in each group at pretest and posttest.[1] Participants were recruited through Facebook using a $5 gift card as compensation for their time. Facebook allows targeting to a set of potential respondents based on location, age, and gender. To prevent contamination of the evaluation, neither the recruitment ads for the survey nor the web survey were branded with *Whoops Proof S.C.* advertising. To minimize overlap in the pretest and posttest sample, each computer IP address was limited to one submission. Further, recruitment ads were served in a manner that provides a random sample for both the pretest and posttest sample groups.

## Survey

Researchers employed a cross-sectional web-based survey at pretest (May 28, 2016–July 13, 2016) and posttest (October 11th–November 25th). Study data was collected and managed using Qualtrics, a secure web application designed to support data capture for research studies, audit trails and a de-identified data export mechanism to common statistical packages (e.g., SPSS).

## Measures

Survey questions include awareness of and attitudes toward IUDs and the implant. Survey items also collected demographic information, including race/ethnicity, age, relationship status, education, employment status, household income, current method of birth control, sexual identity, and sexual history.

Attitudes toward IUDs were assessed via a three-item Likert-scale (capturing perceived convenience, interest, and evaluation of IUDs) ($\alpha = 0.74$) (1 = strongly disagree; 5 = strongly agree). Attitudes toward the implant were also assessed based on survey questions (capturing perceived convenience, interest, and evaluation of the implant) using a Likert-scale ($\alpha = 0.77$) (1 = strongly disagree; 5 = strongly

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[1] Power analysis calculated using G*Power 3.1.9.2. Power calculation assumes required significance level $\alpha = 0.05$, statistical power $1 - \beta = 0.95$, and population effect size = 0.5.

agree). Awareness of IUDs and the implant was measured via a single-item Likert-scale (1 = not at all familiar; 4 = very familiar) survey question. Ad viewership was measured with a single-item scaled measure (1 = every day; 7 = I haven't seen any ads).

## Statistical Analysis

Descriptive statistics were used to analyze participant characteristics. Researchers assumed $p < .05$ with a 95% confidence interval for all analyses. Evaluation of each hypothesis, with an assumed null hypothesis of no mean change, includes 2-sided paired-sample t-tests for statistical significance to determine if there was a significant change in awareness of and attitudes toward IUDs and the implant (i.e., increase) from pretest to posttest in both intervention and control counties. Independent sample t-tests were used to compare changes in awareness and attitudes toward IUDs and the implant among participants exposed to one or more of the top four ads. Previous health and communication research indicates the appropriate use of t-test based on the following criteria: continuous dependent variable (attitudes and awareness) and the comparison of two independent, but related, groups (pretest/posttest and intervention/comparison) to determine a significant difference in means between groups (Mowery 2011; Rietveld and van Hout 2017). A one-way, between subjects ANOVA was conducted to assess variances within the means of attitude and awareness with the additive ads variable (all 10 ads) and ad viewership. A Post-Hoc Tukey's HSD test allowed researchers to identify where variance occurred between means groups. All analyses were performed using IBM SPSS Statistics 23. Further, researchers conducted multiple regression analysis in order to determine if demographic variables (i.e., race, age, income, education, employment, relationship status) impacted campaign results.

## Results

A total of 1439 women in South Carolina responded to the pretest survey and a total of 1534 women responded to the posttest survey. There were no statistically significant demographic differences between pretest and posttest (Table 4). The median age of participants at pretest was $22.03 \pm 3.17$ and at posttest was $21.83 \pm 3.01$ (range 18–29 years). On average, the majority of participants reported a high school degree/equivalent, some college, or a two-year degree at pre and posttest (60%) compared to an estimated average of 78.9% for this level of educational attainment across study counties (US Census Bureau 2012). The oral contraceptive pill was the most commonly used form of birth control

at pretest (N = 621, 45.7%) and posttest (N = 706, 46.3%). Although behavior outcomes were beyond the scope of this campaign, at posttest in the intervention counties, uptake of IUDs (n = 18) and the implant (n = 24) increased by approximately 4%. However, these changes were not statistically significant ($\chi^2 = 0.0441$; $p = .833$ and $\chi^2 = 1.4286$; $p = .232$).

### Awareness of Whoops Proof S.C.

As predicted (H1), at posttest participants in intervention counties (M = 0.11, SD = 0.31) were significantly more likely to report exposure to *Whoops Proof S.C.* campaign messages compared to participants in comparison counties (M = 0.01, SD = 0.11); $t(1533) = -8.466$, $p < .0001$.

### Awareness of IUDs and the implant

Participants in intervention counties did not report a significant increase in awareness of IUDs and the implant from pretest (M = 2.22, SD = 1.01542) to posttest (M = 2.20, SD = 0.91); $t(618) = 0.329$, $p = .0795$, so hypothesis 2 was not confirmed (Table 5). The change in awareness of IUDs and the implant from pretest to posttest among participants in the intervention counties compared to participants in the comparison counties was not significant (Table 6)

### Attitudes toward IUDs and the implant

**Hypothesis 3** correctly predicted that participants in intervention counties would report more positive attitudes toward IUDs and the implant at posttest compared to pretest (Table 5). Among participants in intervention counties, there was a significant increase in positive attitudes toward IUDs from pretest (M = 3.08, SD = 0.84) to posttest (M = 3.14, SD = 0.90); $t(616) = -1.740$, $p = .041$. Older (ages 22–29), college educated, White/Caucasian women reported significantly increased positive attitudes toward IUDs compared to younger (ages 18–21), participants of color, without a college education at posttest in intervention counties (Table 7). Among participants in intervention counties, there was also a significant increase in positive attitudes toward the implant from pretest (M = 2.93, SD = 0.91) to posttest (M = 3.02, SD = 0.93); $t(603) = -1.665$, $p = .048$. Further, the improvement in positive attitudes toward the implant from pretest to posttest among participants in the intervention counties (M = 0.11, SD = 0.15) compared to participants in the comparison counties (M = -.05, SD = 1.3) was significant; $t(604) = 2.771$, $p = .003$ (Table 6).

### Exposure and Response

Supporting hypothesis 4, participants in intervention counties (M = 2.75, SD = 2.61) were significantly more likely

**Table 4** Overall demographic characteristics pretest and posttest in intervention and comparison counties

| Variable (Pretest N = 1439) (Posttest N = 1534) | Pretest overall (May–July 2016) Count (%) | Posttest overall (October–November 2016) Count (%) |
|---|---|---|
| Are you Hispanic or Latina? | | |
| Yes | 71 (4.9) | 67 (4.3) |
| No | 1281 (89) | 1480 (95.7) |
| Race | | |
| White/Caucasian | 1120 (83.3) | 1327 (85.9) |
| Black/African American | 173 (12.9) | 157 (10.2) |
| Asian/Asian American | 59 (4.3) | 68 (4.4) |
| American Indian/Native American | 19 (1.4) | 31 (2) |
| Native Hawaiian/Pacific Islander | 8 (0.6) | 11 (0.7) |
| Other | 27 (2.0) | 35 (2.3) |
| Current relationship/dating status | | |
| Not in a romantic relationship | 410 (28.5) | 505 (32.7) |
| Casually dating one or more people | 177 (12.3) | 189 (12.2) |
| Married, engaged, or committed relationship | 748 (52) | 841 (54.8) |
| Separated | 8 (0.6) | 4 (0.3) |
| Divorced | 4 (0.3) | 4 (0.3) |
| Widowed | 2 (0.1) | 1 (0.06) |
| Sexual relationship over past 12 months | | |
| Men only | 983 (68.3) | 1102 (71.4) |
| Women only | 30 (2.1) | 31 (2) |
| Women and Men | 47 (3.3) | 63 (4.1) |
| No sex with a partner (past 12 mos.) | 286 (19.9) | 347 (22.5) |
| Penile-vaginal intercourse with a man in the last 3 months | | |
| Yes | 857 (59.6) | 975 (63.2) |
| No | 447 (31.1) | 537 (34.8) |
| Unsure | 39 (2.7) | 31 (2) |
| Sexual identity | | |
| Straight/heterosexual (not gay or lesbian) | 1162 (80.8) | 1356 (87.9) |
| Lesbian/gay | 25 (1.7) | 21 (1.4) |
| Bisexual | 111 (7.7) | 115 (7.5) |
| Queer | 12 (0.8) | 12 (0.8) |
| Questioning/unsure | 21 (1.5) | 18 (1.2) |
| Other | 14 (1.0) | 20 (1.3) |
| Highest education | | |
| Less than high school | 22 (1.5) | 18 (1.2) |
| High school degree/GED | 216 (15.0) | 219 (14.2) |
| Some college | 485 (33.7) | 653 (42.4) |
| 2-year college degree | 104 (7.2) | 114 (7.4) |
| 4-year college degree | 403 (28) | 406 (26.3) |
| Post-graduate degree | 113 (7.9) | 132 (8.6) |
| Current employment status | | |
| Working full time now | 564 (39.2) | 470 (30.5) |
| Working part time now | 292 (20.3) | 295 (19.2) |
| Temporarily laid off | 9 (0.6) | 9 (0.6) |
| Unemployed | 37 (2.6) | 34 (2.3) |
| Taking care of family | 37 (2.6) | 35 (2.3) |
| Student | 386 (26.8) | 674 (43.8) |
| Other | 17 (1.2) | 23 (1.5) |

**Table 4** (continued)

| Variable (Pretest N = 1439) (Posttest N = 1534) | Pretest overall (May–July 2016) Count (%) | Posttest overall (October–November 2016) Count (%) |
|---|---|---|
| Total household income before taxes in past 12 months | | |
| Less than $10,000 | 324 (22.5) | 415 (27.2) |
| $10,000–$14,999 | 16 (11.4) | 168 (11) |
| $15,000–$24,999 | 166 (11.5) | 186 (12.2) |
| $25,000–$34,999 | 162 (11.3) | 170 (11.1) |
| $35,000–$49,999 | 165 (11.5) | 186 (12.2) |
| $50,000–$74,999 | 140 (9.7) | 147 (9.6) |
| $75,000–$99,999 | 74 (5.1) | 80 (5.2) |
| $100,000–$149,999 | 78 (5.4) | 92 (6) |
| $150,000 or more | 59 (4.1) | 83 (5.4) |
| County | | |
| Comparison 1 | 315 (23.5) | 323 (21.0) |
| Comparison 2 | 383 (28.6) | 566 (36.9) |
| Intervention 1 | 321 (24.0) | 324 (21.0) |
| Intervention 2 | 320 (23.9) | 323 (21.0) |
| Age | | |
| 18–20 | 525 (36.5) | 665 (39.4) |
| 21–23 | 412 (30.5) | 574 (34.0) |
| 24–26 | 253 (18.7) | 288 (17.1) |
| 27–29 | 160 (11.9) | 162 (9.6) |

Listed as n (%). Frequencies that do not sum to total represent missing data

**Table 5** Awareness of and attitudes toward IUDs and the implant in intervention counties at pretest and posttest

| | Pretest May–July 2016 M (SD) | Posttest October–November 2016 M (SD) | t (df) | p-value |
|---|---|---|---|---|
| Awareness of IUDs and the implant[a] | 2.22 (1.02) | 2.20 (0.91) | 0.329 (618) | 0.0795 |
| Attitudes toward IUDs[b] | 3.08 (0.84) | 3.14 (0.90) | − 1.740 (616) | 0.041* |
| Attitudes toward the implant[b] | 2.93 (0.91) | 3.02 (0.93) | − 1.665 (603) | 0.048* |

[a]Maximum score is 4 = very familiar; Minimum score 1 = not at all familiar

[b] Maximum score is 5 = strongly agree; 1 = strongly disagree

**Table 6** Mean change in awareness of and attitudes toward IUDs and the implant at posttest for intervention and comparison counties

| | Comparison counties M (SD) | Intervention counties M (SD) | t (df) | p-value |
|---|---|---|---|---|
| Awareness of IUDs | − 0.11 (1.44) | − 0.10 (1.48) | − 0.125 (340) | 0.4505 |
| Awareness of the implant | − 0.12 (1.51) | − 0.12 (1.47) | 0.000 (333) | 0.50 |
| Attitudes toward IUDs | 0.02 (1.31) | 0.07 (1.07) | 1.229 (605) | 0.1095 |
| Attitudes toward the implant | − 0.05 (1.3) | 0.11 (0.15) | 2.771 (604) | 0.003* |

*Significance level p < .05

to recall *Whoops Proof S.C.* messaging about IUDs and the implant at posttest compared to participants in comparison counties (M = 0.57, SD = 1.33); t(1533)= -21.371, p < .001. Participants who indicated they had seen the top four messages at posttest (i.e., highest recall frequency) (see Fig. 1) reported a significant improvement in awareness of IUDs and the implant (M = 2.30, SD = 0.94) compared to those who did not recall the top four messages (M = 2.19, SD = 0.89); t(1662)=-2.371, p = .009, supporting hypothesis 4a. Further, college-aged women (ages 18–21) recalled the

**Table 7** Multiple regression model for awareness of and attitudes toward IUDs and the implant in intervention counties at posttest

| | B | SE | β | F | Adjusted $R^2$ |
|---|---|---|---|---|---|
| Awareness of IUDs and the implant | | | | | |
| Age | 0.077 | 0.082 | 0.043 | 2.577 | 0.016 |
| Race | −0.070 | 0.108 | −0.027 | | |
| Income | −0.098 | 0.092 | −0.045 | | |
| Education level | 0.296 | 0.101 | 0.126* | | |
| Employment | 0.110 | 0.083 | 0.060 | | |
| Relationship status | 0.094 | 0.077 | 0.052 | | |
| Attitudes toward IUDs | | | | | |
| Age | 0.200 | 0.080 | 0.113* | 3.040 | 0.021 |
| Race | 0.213 | 0.105 | 0.085* | | |
| Income | −0.018 | 0.091 | −0.009 | | |
| Education level | 0.196 | 0.099 | 0.085* | | |
| Employment | 0.135 | 0.082 | 0.074 | | |
| Relationship status | −0.084 | 0.075 | −0.047 | | |
| Attitudes toward the implant | 0.000 | 0.085 | 0.000 | 0.371 | −0.007 |
| Age | | | | | |
| Race | 0.009 | 0.111 | 0.004 | | |
| Income | −0.081 | 0.096 | −0.037 | | |
| Education level | 0.091 | 0.104 | 0.038 | | |
| Employment | 0.032 | 0.087 | 0.017 | | |
| Relationship status | −0.064 | 0.079 | −0.034 | | |

*Significance level p < .05

top four messages significantly more often than older women (ages 22–29) (Table 8).

**Hypothesis** 4ai correctly predicted that participants who recalled the top four messages at posttest reported a significant improvement in positive attitudes toward IUDs (M=3.28, SD=0.88) and the implant (M=3.10, SD=0.92) compared to those who did not recall the top four messages (M=3.16, SD=0.88); t(1556)=-2.727, p=.003; (M=3.00, SD=0.89); t(1556)=-2.058, p=.02.

**Hypothesis 5** correctly predicted that increased exposure to *Whoops Proof S.C.* at posttest (more than once per week) significantly increased awareness of IUDs and the implant [F(6,1532)=5.571, p=.001], and positive attitudes toward IUDs [F(6,1525)=3.201, p=.004] and the implant [F(6,1515)=2.920, p=.008] compared to those who did not see any ads or messages in the past 6 months (Table 9). In addition, older women (ages 22–29) reported significantly increased exposure to campaign messages compared to college-aged women (ages 18–21) (Table 8).

## Discussion

The current study assessed women's awareness of and attitudes toward highly effective contraceptive methods following implementation of the *Whoops Proof S.C.* campaign. This study utilized a pair-matched group pretest–posttest quasi-experimental design in four counties in South Carolina. Women in the intervention counties were significantly more likely to be aware of the *Whoops Proof S.C.* campaign than those in the comparison counties at the end of the intervention. Following implementation of the campaign, participants in the intervention counties were significantly more likely to report positive attitudes toward IUDs and the implant. This communication campaign offers implications for improving awareness of and attitudes toward LARC methods and reducing unintended pregnancy.

Participants who saw *Whoops Proof S.C.* campaign messages reported improved attitudes toward IUDs and the implant. This finding supports previous research that increasing positive regard for LARC methods may depend on providing comprehensive (Eisenberg et al. 2012) and correct information about these methods (Russo et al. 2013; Sundstrom et al. 2015). The campaign's positive impact on attitudes points to the role of health communication messages to normalize IUDs and the implant. Building on extant research, results suggest that messaging can improve
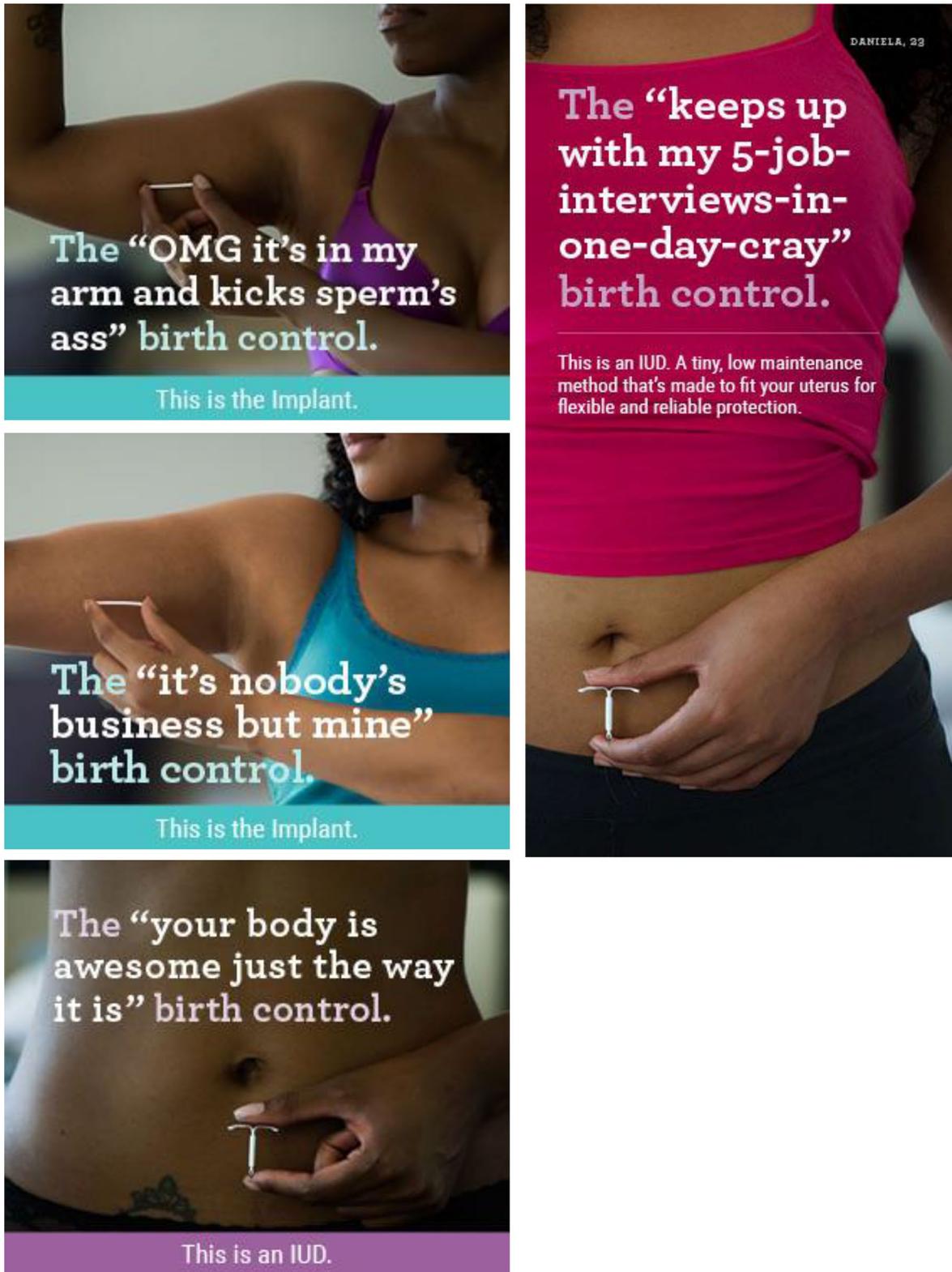
**Fig. 1** Top four ads

**Table 8** Multiple regression model for campaign exposure in intervention counties at posttest

| | B | SE | β | F | Adjusted $R^2$ |
|---|---|---|---|---|---|
| Exposure to campaign | | | | | |
| Age | 0.425 | 0.182 | 0.106* | 1.818 | 0.008 |
| Race | −0.311 | 0.236 | −0.055 | | |
| Income | −0.236 | 0.206 | −0.049 | | |
| Education level | −0.076 | 0.224 | −0.015 | | |
| Employment | 0.264 | 0.186 | 0.064 | | |
| Relationship status | 0.170 | 0.170 | 0.042 | | |
| Recall of top four ads | −0.463 | 0.142 | −0.146** | 2.852 | 0.019 |
| Age | | | | | |
| Race | 0.325 | 0.185 | 0.073 | | |
| Income | 0.108 | 0.161 | 0.028 | | |
| Education level | 0.113 | 0.175 | 0.028 | | |
| Employment | 0.013 | 0.145 | 0.004 | | |
| Relationship status | −0.027 | 0.133 | −0.009 | | |

*Significance level p < .05

**Significant level p < .001

attitudes by increasing acceptability of these methods among young women (Sundstrom et al. 2016, 2015).

Participants who reported increased recall frequency were significantly more likely to be aware of and hold positive attitudes toward IUDs and the implant. This finding elaborates previous campaign research (Andersen et al. 2008; Sundstrom et al. 2016), indicating that high message recall can prompt improved awareness and attitudes. This finding demonstrates that campaigns can improve valuations of a health behavior by choosing a small number of high impact messages to disseminate over various channels. This is particularly useful when cost-effective campaign work is a priority because it removes the need for a variety of messages. Since attitudes provide an important step toward behavioral intention and subsequent adoption (DeMaria et al. 2017),

improving attitudes toward LARC through one or two key messages may lead to adoption.

Increased exposure to *Whoops Proof S.C.* messages (more than once per week) significantly improved attitudes toward IUDs and the implant. This finding elaborates previous research suggesting the importance of message saturation to behavior change (Andersen et al. 2008; Scott et al. 2008). Results indicate that health communicators should ensure that the target audience receives campaign messages through a variety of channels, including traditional and new media, in order to increase exposure to the campaign. While repetition matters, health communicators should avoid message fatigue by rotating and refreshing messages. Novel practical implications include determining communication channels based on the target audiences' preferences and focusing on disseminating the most effective messages rather than a multitude of messages. This study suggests that improving message recall and saturation may improve women's attitudes toward highly effective contraceptive methods.

Surprisingly, participants overall did not report increased awareness following the *Whoops Proof S.C.* campaign. Findings may reflect improved overall awareness of IUDs and the implant resulting from a modest increase in use in recent years (Finer et al. 2012; Finer and Zolna 2016; Guttmacher Institute 2015a). Since awareness was relatively high in intervention and comparison counties at baseline, there may be factors other than lack of awareness preventing women from using a highly effective contraceptive method. Previous research indicates that cost and access may serve as barriers to uptake of IUDs and the implant (Secura et al. 2011). Future campaigns should focus on identifying and reducing barriers to improve uptake of highly effective contraceptive methods.

Although college-aged women indicated better recall of the top four ads, women in intervention counties between the ages of 22–29 years old reported increased campaign exposure and positive attitudes toward IUDs at posttest. This finding extends previous research illustrating the challenges of reaching younger, college-aged women with effective messages about LARC methods (Sundstrom et al. 2015). Robust understanding and insight into this younger target audience

**Table 9** Exposure to the *Whoops Proof S.C.* campaign at posttest for all exposed participants in intervention counties

| | More than once per week M | Haven't seen any ads or messages in the past 6 months M | F (df) | p-value |
|---|---|---|---|---|
| Awareness of IUDs and the implant | 2.38[1] | 2.06 | 5.571 (6, 1532) | 0.001* |
| Positive attitude toward IUDs | 3.21[2] | 3.07 | 3.201 (6, 1531) | 0.004* |
| Positive attitude toward the implant | 3.20[2] | 2.92 | 2.920 (6, 1521) | 0.008* |

*Significance level p < .05

[1] Maximum score is 4 = very familiar; 1 = not at all familiar

[2] Maximum score is 5 = strongly agree; 1 = strongly disagree

will allow for message development and dissemination that resonates with and targets diverse women in order to close gaps based on age, race/ethnicity, and education to increase awareness of and positive attitudes toward LARC methods.

White, college-educated participants reported improved positive attitudes toward IUDs at posttest. This finding may help to explain why women of color are less likely to choose LARC methods (Secura et al. 2011). Previous research exploring racial/ethnic disparities in LARC usage indicates that women of color report less favorable attitudes toward LARC methods due to a history of reproductive coercion and clinician recommendation biases (Dehlendorf et al. 2010; Downing et al. 2007; Ryder 2014). Health communicators should recognize these demographic disparities, and employ insights from diverse groups, including younger women and women of color in campaign design, development, and implementation.

## Limitations

Although a pair-matched group pretest–posttest quasi-experimental design may address threats to validity due to lack of randomization, this study was limited by real-world conditions and the potential for contamination. The study population may differ in important ways from the broader target community. Although 90% of young adults ages 18–29 report using social media and there are no longer notable differences in social media use by age, race/ethnicity or rurality (Smith and Anderson 2018), the demographics of this study did not match the diversity of South Carolina. Specifically, participants tended to be younger (ages 18–23) and to identify as a student, which may suggest increased interest or willingness to complete web-based surveys among this population. Future research should address this disparity by implementing quota sampling. Web-based recruitment efforts limited participants in the study to those with access to a computer or smart phone/tablet. In addition, the online nature of the survey may have resulted in participant dropout and response bias. Further, the amount of time between the pretest and posttest administration, including the competing local and national campaigns aimed at the target audience, may have served as a limitation.

The *Whoops Proof S.C.* campaign offers health communication strategies to optimize exposure and recall frequency to increase awareness of and positive regard for highly effective contraceptive methods. Clinical implications include the opportunity to normalize LARC methods for increased usage rates among young women within the United States.

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