A Social-Marketing Intervention and Concussion-Reporting Beliefs

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Context: Concussion-symptom education remains the primary approach used by athletic trainers to address underreporting of possible sport-related concussions. Social marketing represents an untapped approach to promote concussion reporting by communicating the benefits or consequences of reporting or not reporting, respectively.

Objective: To apply expectancy value theory and identify how marketing the possible consequences of concealing concussion symptoms influenced young adults’ concussion-reporting beliefs to increase the likelihood of reporting.

Design: Randomized controlled clinical trial.

Setting: Laboratory.

Patients or Other Participants: A total of 468 competitive collegiate club sport athletes at a large US university who engaged in 1 of 46 sports with various levels of concussion risk.

Intervention(s): Participants were randomly assigned by team to 1 of 3 conditions. The treatment condition was a social-marketing program focused on the possible consequences of the reporting decision. The control condition was traditional concussion-symptom education based on the National Collegiate Athletic Association’s publication, “Concussion: A Fact Sheet for Student-Athletes.” An additional condition mirrored the traditional symptom education but included a less clinical delivery.

Main Outcome Measure(s): Positive and negative beliefs regarding concussion reporting were assessed. We applied expectancy value theory, which posits that changing beliefs in the short term will produce greater reporting intentions in the long term.

Results: Club sport athletes exposed to consequence-based social marketing showed higher levels of positive reporting beliefs and lower levels of negative reporting beliefs than athletes exposed to traditional or revised symptom education. We observed no differences between the traditional and revised symptom-education programs. Exposure to consequence-based marketing decreased negative beliefs about reporting (B = −0.165, P = .01) and increased positive beliefs about reporting (B = 0.165, P = .01).

Conclusions: Social marketing offers athletic trainers another strategic tool for motivating athletes to report concussion symptoms by translating scientific findings into marketable statements and then communicating the benefits of reporting or the negative consequences of concealing concussion symptoms.

Key Words: concussion education, expectancy value theory, sport-related concussion, help seeking

Key Points

- Marketing the consequences of the concussion-reporting decision improved beliefs supportive of reporting and decreased beliefs unsupportive of reporting to a greater extent than educating athletes about symptoms.
- Appropriately worded social-marketing statements could alter athletes’ beliefs about concussion.
- Ongoing efforts to accomplish this translation and communication would positively and substantially affect the willingness of athletes to report concussion-like symptoms.
- The social-marketing approach showing the consequences of not reporting a possible concussion and the benefits of early reporting provides athletic trainers with another strategic tool in these efforts.

Sport-related concussions (SRCs) remain an important public health concern for the millions of participants in youth, interscholastic, and intercollegiate sports.1 Athletic trainers (ATs) play a central role in the education, prevention, clinical diagnosis, and treatment of athletes with concussions, including the translation of scientific evidence for athletes and others involved in sports.2 The task of assessing and delivering concussion information frequently falls to the AT.3 Interventions designed to increase reporting have relied primarily on concussion-symptom education in the belief that an increase in young adults’ knowledge of symptoms will motivate greater concussion reporting.

However, authors of several studies4-6 have raised questions about the relationship between explicit concussion knowledge and greater SRC reporting or reporting intention. Whereas advancements have occurred in the treatment of concussions, relatively little progress has been made in providing ATs with a broader set of tools for motivating athletes to report concussion-like symptoms, with estimates that ≥50% of concussions may go unreported.1,7 The underreporting of concussions affects individual care,8 the broader community in which the athlete is situated, and an understanding of the true burden of SRC.Investigators9,10 have examined concussion-symptom disclosure from the perspective of the socioecological
model. This model places the individual and his or her behavior in the context of interpersonal relationships, community, and society. From this perspective, changes in the individual can be motivated by changes in the context or environment (eg, team culture).9,10 Also, education is a contextual approach that can be aimed at either the individual or at any level in his or her context (ie, interpersonal, community, or societal) with the purpose of producing a socially desirable outcome.

We built on the expanded theoretical view of concussion reporting by introducing social marketing as another strategic tool to be deployed in the socioecological system related to sports. In this study, we introduced a process by which research findings related to concussions and concussion reporting can be translated into claims that can be marketed to athletes in support of their concussion-reporting decisions. Therefore, our intent was less about the specific claims used in this research and more about learning the process by which those claims were translated and used.

We used the expectancy value theory (EVT) as our theoretical perspective (Figure 1).11 The EVT posits that changes in expectancies (ie, beliefs about the likely outcomes or consequences of a behavior) drive changes in attitudes and, ultimately, behaviors. For example, helping students believe that science is important to their desired future improves their attitude toward the study of science and, ultimately, their engagement in the course.12 According to EVT, if we aim our interventions at beliefs about the decision and its outcomes rather than the ability to recall symptoms or general facts, the likelihood of producing the desired behavior (ie, symptom reporting) will increase.

From the EVT perspective, social marketing provides a novel approach to the concussion-reporting intervention an AT might use to increase positive or supportive beliefs regarding the likely outcomes or consequences of concussion reporting while reducing negative beliefs that might detract from the likelihood of reporting.13 Marketing is a discipline used to establish and change beliefs, typically for selling a product. Social marketing is similar to marketing except for the desired outcome. Whereas marketing seeks a financial gain for the marketer, social marketing seeks a return for the target audience and its interpersonal relationships, community, and society.13 Social marketing has been used in efforts such as smoking cessation14 and recognized as an effective tool across a number of public health concerns.15,16 Education operates on the belief that knowledge is sufficient to change behavior; social marketing makes the individual’s return on the behavior explicit while respecting his or her right to choose.14 With education as the strategic tool, the athlete must translate explicit knowledge into the decision-making process. With social marketing as the strategic tool, the message for the athlete focuses squarely on the decision itself, with the information being presented in the context of the decision to be made. Therefore, the purpose of our study was to compare the effect of a consequence-based social-marketing approach with that of explicit concussion-knowledge education. The primary outcomes of interest were the positive and negative beliefs that athletes held regarding symptom reporting. We hypothesized that exposure to the social-marketing approach would produce a greater increase in positive reporting beliefs and a greater decrease in negative reporting beliefs than exposure to explicit concussion-knowledge education.

**METHODS**

We examined the effect of the consequence-based social-marketing approach on reporting intentions relative to traditional concussion-symptom education and a revised program of concussion-symptom education in a controlled experiment with club sport athletes. Before the experiment, we used cross-sectional data from a national sample of 18- to 24-year-old athletes across a variety of sports to develop and validate measures for our outcomes of interest: concussion-reporting beliefs and attitudes. The sample for scale development contained panelists from Survey Sampling International (now Dynata, Shelton, CT) who participated regularly in 1 of 36 sports or physical activities, such as archery, boxing, fencing, field hockey, ice hockey, rugby, swimming, table tennis, and wrestling. The samples were representative of the United States in terms of race, ethnicity, and census region, with roughly one-third of participants enrolled in 4-year colleges at the time of the survey. The cross-sectional data were used only to establish valid, reliable measures for the experiment.

**Interventions**

We developed 3 video interventions using 3 fact sheets (Figure 2) and a design-thinking process with active young adults, 1 for each of the 3 interventions. The video for treatment condition 1 (traditional concussion-symptom education) can be found at https://youtu.be/zSWyysXMs; treatment condition 2 (revised concussion-symptom education), https://youtu.be/LPBbvZcMuDE; and treatment condition 3 (consequence-based or social-marketing concussion-symptom education), https://youtu.be/hHsqaZkROMA.

The traditional concussion-symptom education program based on the National Collegiate Athletic Association’s “Concussion: A Fact Sheet for Student Athletes”17 was the comparison condition for this study. This intervention exposes athletes to the signs and symptoms of a concussion in a clinical way, with a secondary message of what to do if they are experiencing any symptoms. The program operates from the perspective that if athletes know what a concussion is, understand what might cause it, and can recognize the symptoms, they will engage in the desired reporting behavior.

The revised symptom-education intervention was based on the reactions of participants in the design-thinking sessions to traditional symptom education as well as recommendations for the prioritization of information (ie, hierarchy of information) presented and language used. This intervention focused more on translating the information into plain language, creating a checklist of symptoms,
Figure 2. Intervention fact sheets. A, “Concussion: A Fact Sheet for Student-Athletes.” Reprinted with permission from the National Collegiate Athletic Association, Indianapolis, IN. B, Concussion: “Symptoms & Actions.” C, “Concussion: Decisions & Outcomes.”
removing or combining seemingly redundant symptoms, and eliminating the ways of preventing a concussion that participants believed were not relevant to the decision of whether to report symptoms. This intervention provided a second symptom-focused program that allowed us to examine whether our findings were related to symptom education per se or, instead, to the way in which the symptom education was delivered (clinical versus more accessible).

Consequence-focused marketing, the third condition, was developed using principles of social marketing and focusing on some possible consequences of behavioral choices related to disclosing or not disclosing concussion-like symptoms as a means of changing individual behavior. We consulted research that focused on the consequences of a concussion, especially an untreated concussion, and, where available, the effect of athletes being treated right away versus waiting or not telling anyone about symptoms. The question being tested with this intervention was whether a shift in emphasis from the symptoms of a concussion to the decision to be made and the potential consequences (or benefits) of the reporting decision would increase the desired behavior. The challenge in developing this intervention was in connecting the available science with what young adults value in a way that changes behavioral beliefs in the desired direction. Through a review of the literature, discussions with experts in the field, and a review of athlete testimonials on the Headway Foundation Web site (http://headwayfoundation.com), we identified a list of candidate statements to share in our design-thinking session.

Key to the intervention was finding balance in our statements. Balance refers to a tone that was sufficiently compelling to warrant consideration without being so forceful as to promote disbelief. For each statement, we developed soft, acceptable, and extreme versions of marketing messages to test with our young-adult audience. Design-thinking sessions were held to allow the candidate statements to be reviewed by a group of college-aged students.

\*Questions are reproduced in their original format.

**Table 1. Consequence Marketing Statements**

| Statement | Description |
|-----------|-------------|
| You will likely feel miserable and, perhaps, experience higher levels of depression, anxiety, and self-doubt. | Soft version |
| You will perform more poorly in your sport and may not ever get back to your previous performance level. | Soft version |
| You put yourself at greater risk for other types of injury. | Soft version |
| You increase the time it will take to recover. | Soft version |
| You may impact academic performance, personal relationships, or ability to hold down a good job. | Soft version |
| You set yourself up for a second impact that, while rare, can lead to death. | Soft version |
| You may be putting yourself at greater risk for dementia or other mental health problems later in life. | Soft version |

An important element of social-marketing statements is the use of the word you. In a marketing context, the word you is used to encourage targeted individuals to internalize the message, ie, the potential consequences. From an EVT perspective, we wanted individuals to consider the message relative to what matters to them in life. It is important for the information to be personalized and for elaboration to occur. This objective stands in contrast to that of a research report in which information is presented as probabilities or the average result in a population but is not considered predictive at an individual level. Our translation involved using research findings to inform marketing statements. In this way, we were attempting to build a bridge between these languages so that we could test whether such an effort holds promise in encouraging young athletes to seek care for their concussion-like symptoms.

Working with the young adults, we selected the messages to be included in the consequence-based social-marketing intervention. These statements were intended to be social-marketing messages derived from the current state of knowledge and were worded to motivate attention and elaboration by the design-thinking participants. None of the messages selected provoked a sense of fear in the participants. The final statements used in the consequence condition are provided in Table 1. Our intent was not to claim these statements as the definitive statements motivating concussion reporting. Instead, we shared the method by which we arrived at these statements to encourage a broader consideration of how rapidly evolving scientific findings can be continuously translated into effective social-marketing statements to motivate concussion reporting. Nonetheless, these are the statements we used in our study.
Measures

The primary outcome measure was reporting beliefs, or the individual’s expectations regarding the decision to report. The reporting-belief scale items were adapted from Kroshus et al. Two additional constructs, reporting attitudes and reporting intentions, were used to assess whether the data fit the model suggested by EVT. Candidate items for reporting attitudes were sourced from several existing measures of the construct. Reporting intentions were assessed using a 100-point sliding scale on which athletes rated how likely they would be to report a possible concussion if they were reporting symptoms, with 100 representing would definitely report and 0 representing would definitely not report.

To determine the measurement properties of the reporting-beliefs and reporting-attitudes scales, we revised the belief and attitude items by removing specific sport and gender references and assessed the face validity of the candidate items to narrow the list. As described, 2 waves of data were collected external to the experiment from national samples of active 18- to 24-year-olds. Wave 1 contained 499 responses and was used for the exploratory factor analysis (EFA) on reporting beliefs and attitudes. Wave 2 contained 403 responses and was used for the confirmatory factor analysis (CFA) on reporting beliefs and attitudes.

Study Design

For the experiment, we used a cluster-randomized controlled trial to assess the 2 new interventions relative to the traditional concussion-symptom knowledge educational material with competitive club sport athletes. A total of 46 club sports teams representing an estimated 1555 athletes registered with the Recreational Sports Department during the 2017–2018 academic year.

To accomplish the randomization, we first stratified teams by high, moderate, or low concussion risk based on the available epidemiologic evidence or, when such evidence was not available for a given sport, based on clinical experience. Within each stratum, we randomly assigned teams to the traditional concussion-symptom education program, the revised concussion-symptom education program, or the consequence-based social-marketing program. Randomization was accomplished by weighting teams by team size and concussion risk and then using the random number generator in Excel (version 2016; Microsoft Corp, Redmond, WA) to assign each team to a treatment condition while ensuring that the conditions had fairly equal numbers of athletes. The list of teams with their risk and treatment assignments is shown in Table 2. This stratified random approach ensured that each treatment group had an equal mix of concussion risks. Random assignment at the team level was important given the amount of time teammates spend with each other. All members of a given team received the same treatment, although they were not required to attend laboratory sessions together.

The research team member responsible for random assignment (not an author) was not involved in study administration and had no interaction with the teams or athletes. The survey was programmed in Qualtrics (Provo, Utah).
visit. Whether the session involved completing an online laboratory, and student identification was checked at each initial team practice or the athlete’s first visit to the fall 2017 semester. Informed consent was obtained at an during the mandatory Recreational Sports meeting for the sport teams. We notified team officers about the research

assigned. After viewing the video, they responded to the signed into their Lab 2 Qualtrics survey and were presented earbuds unless they brought their own headphones. They athletes reported for Lab 2, they were provided with and assess our primary outcome: reporting beliefs. When the EVT model fit the data and to provide a baseline of athletes reported for Lab 1. We used Lab 1 data to confirm that the EVT model fit the data and to provide a baseline of percentage of their consenting athletes who had participated but never provided the names of who had or had not consented or participated. Athletes received a coupon for a double scoop of ice cream from the university’s dairy store with each laboratory visit.

A total of 465 athletes entered the study by completing Lab 1 and formed the base of our study. Of these athletes, 458 (98.5% of Lab 1) completed Lab 2. Table 3 presents participation by risk level and treatment condition. Table 4 contains the sample characteristics.

Data Analysis

Development of the reporting beliefs and reporting attitudes scales was accomplished using principal components analysis with direct oblimin rotation in SPSS (version 26; IBM Corp, Armonk, NY) for the EFA followed by CFA in Mplus (version 8; Muthén & Muthén, Los Angeles, CA). Lab 1 data were assessed to confirm the relationships among beliefs, attitudes, and intentions suggested by EVT. Ordinary least squares (OLS) regression in SPSS was calculated for this analysis. We applied multilevel modeling to evaluate whether the inclusion of random effects for teams and concussion-risk categories improved the model. Given that the model without random effects was selected, OLS regression was used to evaluate the experimental hypotheses regarding the ability of the interventions to produce changes in reporting beliefs. The models met OLS assumptions of normality, homoscedasticity, and multicollinearity.

A priori power analysis was conducted using the $F$ test and analysis of covariance in G*Power (version 3.1; Universität Düsseldorf, Düsseldorf, Germany). The sample sizes required for powers of 0.80 and 0.90 were estimated for a medium effect size (0.25) with an $\alpha$ of .05, numerator degrees of freedom of 3, groups of 3, and covariates of 1. The sample size required for a power of 0.80 was 179 and for a power of 0.90 was 231. Actual sample sizes for Lab 1 (n = 465) and Lab 2 (n = 458) exceeded these thresholds.

RESULTS

Our analyses were focused on (1) developing the reporting-beliefs and -attitudes scales using the survey data collected for scale-development purposes, (2) confirming the EVT model using the Lab 1 data, and (3) evaluating the experimental results using Lab 2 data.
The first step in our analysis was to develop the scales used to assess reporting beliefs and reporting attitudes. We conducted EFA and CFA using 2 waves of survey data collected external to the experimental design.

First, we developed the scale for reporting beliefs. As Kroshus et al. speculated, EFA with principal components analysis and direct oblimin revealed 2 factors that explained 64.637% of the variance. One factor containing 3 items was labeled positive beliefs, and the other containing 4 items was labeled negative beliefs. Factor loadings were $\geq 0.600$. Composite reliability was $\geq 0.700$, and the average variance explained was $\geq 0.500$. The EFA results and final scale items are presented in Table 5.

Table 5. Exploratory Factor Analysis Results for Concussion-Reporting Beliefs and -Reporting Attitudes

| Construct            | Dimensions, No. | Items, No. | Variance Explained, % | Cronbach $\alpha$ | Composite Reliability | Average Variance Explained |
|----------------------|-----------------|------------|-----------------------|-------------------|-----------------------|---------------------------|
| Reporting beliefs    | 2               |            | 64.637                |                   |                       |                           |
| Factor 1: Better off if report | 3               | 0.835      | 0.900                 | 0.750             |                       |                           |
| Factor 2: Worse off if report | 4               | 0.731      | 0.836                 | 0.561             |                       |                           |
| Reporting attitude   | 2               |            | 70.809                |                   |                       |                           |
| Factor 1: Better to tell | 3               | 0.775      | 0.871                 | 0.692             |                       |                           |
| Factor 2: Little to be gained | 3               | 0.809      | 0.887                 | 0.723             |                       |                           |

Reporting beliefs
Positive reporting beliefs
- I will be better off in the long run. 0.819 0.912
- My family, friends, etc, will be better off in the long run. 0.712 0.822
- I have a higher chance of a full recovery. 0.723 0.854
Negative reporting beliefs
- I will fall behind. 0.558 0.732
- Others will think less of me. 0.640 0.810
- I will be held out of upcoming events even if it is not a concussion. 0.553 0.704
- I will make a temporary situation something bigger than it needs to be. 0.520 0.720

Reporting attitudes
Positive reporting attitudes
- If I thought I might have a concussion, I would tell someone just in case I do. 0.701 0.836
- It is better to tell someone you have a concussion and be wrong than to keep it to yourself. 0.718 0.844
- It is always better to tell someone you are experiencing concussion-like symptoms than to keep it to yourself. 0.662 0.811
Negative reporting attitudes
- Unless your symptoms are really severe, there is little reason to tell someone about them. 0.698 0.835
- There is little risk in waiting a few days to see if your concussion-like symptoms go away before telling anyone. 0.730 0.853
- There is little to be gained by telling someone you might have a concussion. 0.742 0.861

Communality
Factor Loading

Table 6. Descriptive Statistics for Concussion-Reporting Beliefs, Attitudes, and Intentions

| Variable                 | Mean $\pm$ SD     |
|--------------------------|-------------------|
| Lab 1 reporting intentions | 73.7612 $\pm$ 27.2857 |
| Lab 1 reporting beliefs  |                   |
| Positive                 | 4.3034 $\pm$ 0.7409 |
| Negative                 | 2.4077 $\pm$ 0.7302 |
| Lab 1 reporting attitudes |                   |
| Positive                 | 3.7707 $\pm$ 0.9185 |
| Negative                 | 2.0503 $\pm$ 0.8410 |
| Lab 2 reporting beliefs  |                   |
| Positive                 | 4.5519 $\pm$ 0.6104 |
| Negative                 | 2.3361 $\pm$ 0.6680 |

Scale Development: Reporting Beliefs and Reporting Attitudes

The first step in our analysis was to develop the scales used to assess reporting beliefs and reporting attitudes. We conducted EFA and CFA using 2 waves of survey data collected external to the experimental design.

First, we developed the scale for reporting beliefs. As Kroshus et al. speculated, EFA with principal components analysis and direct oblimin revealed 2 factors that explained 64.637% of the variance. One factor containing 3 items was labeled positive beliefs, and the other containing 4 items was labeled negative beliefs. Factor loadings were $\geq 0.600$. Composite reliability was $\geq 0.700$, and the average variance explained was $\geq 0.500$. The EFA results and final scale items are presented in Table 5.

Wave 2 data collected with the same sample requirements and questions were used to conduct the CFA. The CFA for reporting beliefs suggested that the factor structure fit the Wave 2 data reasonably well ($\chi^2 = 53.042$, $\text{RMSEA} = 0.087$, $\text{CFI} = 0.943$, $\text{TLI} = 0.909$).

Reporting attitudes was the second scale developed for the study. The EFA with Wave 1 data revealed a 2-dimensional scale that explained 70.809% of the variance. Factor loadings, composite reliability, and average variance explained exceeded the minimum thresholds. The CFA for reporting attitudes suggested that the factor structure fit the Wave 2 data well ($\chi^2 = 16.932$, $\text{RMSEA} = 0.053$, $\text{CFI} = 0.988$, $\text{TLI} = 0.978$).

To assess the discriminant validity of reporting beliefs and attitudes, we conducted an additional CFA, treating the positive dimensions of beliefs and attitudes as a single factor and treating the negative beliefs and attitudes the same. The fit of this model was clearly worse than the separate beliefs and attitudes scales and did not meet the criteria for reasonable fit ($\chi^2 = 487.342$, $\text{RMSEA} = 0.087$).
Constant 3.210

Reporting attitudes

| Reporting attitudes | B  | β  | P Value |
|---------------------|----|----|---------|
| Positive            | 0.366 | 0.296 | <.001  |
| Negative            | -0.422 | -0.335 | <.001  |

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Our analysis of Lab 2 focused on the ability of the 3 interventions (ie, traditional symptom education, revised symptom education, and consequence marketing) to influence reporting beliefs. The primary variable of interest was the reporting beliefs (positive and negative) that the athletes held regarding concussions. These beliefs did not exist external to the athlete. Therefore, a subjective self-report was the proper measure.

Because randomization was accomplished at the team level within concussion-risk categories, we first examined models with random effects for team and risk level. We estimated positive- and negative-belief models at the athlete level, for athletes nested within teams, and for athletes nested within teams nested within concussion-risk levels. The positive-belief model controlled for positive beliefs in Lab 1, and the negative-belief model controlled for negative beliefs in Lab 1. A comparison of the Bayesian information criterion for the models revealed that the simplest model (ie, the one with no random effects [athlete level]) was best (Table 8) and, thus, is discussed here.

Given the fixed-effects–only model selection, we used OLS regression to examine the relationship between reporting beliefs and intentions, controlling for beliefs in Lab 1. The models met the normality, homoscedasticity, and multicollinearity assumptions of OLS regression reasonably well. Positive and negative beliefs were related to positive attitudes ($R^2 = 0.234$) and to negative attitudes ($R^2 = 0.250$) in the expected directions. As illustrated in Table 7, positive beliefs were associated with higher positive attitudes and lower negative attitudes, whereas negative beliefs were associated with lower positive attitudes and higher negative attitudes. Positive and negative attitudes were related to reporting intentions ($R^2 = 0.295$) in the expected directions, with positive attitudes associated with higher intentions and negative attitudes associated with lower intentions. These results supported the EVT propositions that beliefs influence attitudes and attitudes influence behavioral intention. Next, we used Lab 2 data to examine whether the treatment conditions produced differences in positive and negative reporting beliefs.

### Experimental Results: The Effect of Consequence-Based Social Marketing on Reporting Beliefs

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the positive and negative reporting-beliefs models are presented in Table 9.

### DISCUSSION

In a controlled experiment with club sport athletes, we demonstrated that marketing the consequences of the reporting decision improved beliefs supportive of reporting and decreased beliefs unsupportive of reporting to a greater extent than educating athletes about symptoms.\(^{14,15}\) The lack of difference between the traditional and revised symptom education confirmed that our findings reflected the content (education versus marketing) rather than the voice or tone of delivery (scientific versus accessible). These results suggested that the translation of scientific evidence into social-marketing messages influenced whether athletes reported their symptoms by altering the narrative playing in their minds.\(^{13,14}\) The EVT posits that, when deciding whether to report, athletes consider their expectations regarding what will happen if they tell versus not tell someone about the symptoms they are experiencing. When the expectancies of the decision are clear and grounded in the latest research, it is more likely that circumstances supportive of reporting will emerge.

Considerable work has been conducted to examine how concussion-reporting behaviors are influenced by local culture and norms that can sometimes negatively affect reporting.\(^{2}\) One interesting feature of marketing is its ability to shape culture and norms. Conussion programming that uses a consequence-based social-marketing strategy has the potential to establish a culture of positive decision making and improved concussion reporting.

Athletic trainers are frequently tasked with delivering mandated concussion education.\(^{3}\) Our findings add a new strategic tool, social marketing, to the AT’s tool kit for designing and selecting concussion-education materials. Incorporating social-marketing methods in concussion-reporting efforts requires the translation of current scientific knowledge into compelling statements designed to influence beliefs regarding the value of reporting. This translation is not necessarily a comfortable or familiar task for many ATs or concussion researchers, given the rapidly evolving base of scientific knowledge in the field and the standards of evidence required in scientific communication. However, we propose that the translation is worth the effort.

Our investigation demonstrated the power of appropriately worded social-marketing statements to alter the concussion beliefs of athletes. From a social-marketing perspective, the claims made in this study were relatively conservative. Social-marketing messages and research reports are distinct languages with unique objectives and methods. Social marketing emphasizes the importance of compelling messages designed to promote optimal choices made freely by the individual by communicating incentives and consequences for those choices.\(^{14,15}\) We assumed that the reporting of concussion-like symptoms was the optimal choice for the athlete to make and a choice that was more likely to provide benefits and avoid consequences. Yet clearly, not everyone who reports symptoms will avoid consequences and not everyone who chooses not to report will experience consequences, just as not everyone who smokes develops cancer.

An important consideration when implementing this process is the level of evidence required before a particular social-marketing statement can be used. Through careful evaluation, we selected findings in the literature, crafted soft to extreme versions of those statements, and tested the statements with active young adults to find the “sweet spot” between lack of attention and overstatement. Those efforts are only half of what is required to implement this method. The other half requires gaining consensus among researchers and clinicians in the field who may not be comfortable with social-marketing methods regarding which studies and findings can be used in drafting the statements. One extreme suggests that this method can be applied only when we have definitive causal evidence of a relationship. The other extreme, which no one would be likely to accept, suggests that “anything goes” as long as the athlete responds as intended. We tried to land in the middle: the belief that we should leverage the current state of knowledge with language that represented knowledge accurately while making a sufficiently compelling claim. Identifying the right balance should stem from a conversation in the field that establishes guidelines to balance the effect of the social-marketing statement on the athlete’s decision with evidence thresholds for inclusion in a social-marketing program, recognizing that the level of evidence required for behavioral change may not be the same as that for scientific communication or clinical treatment.

Based on our findings, we believe that ongoing efforts to accomplish this translation and communication would have a positive and substantial effect on the willingness of athletes to report concussion-like symptoms. Current scientific knowledge can be translated into accurate but accessible and compelling statements regarding the conse-

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**Table 9. Experimental Results for the Effect of Treatments on Positive and Negative Concussion-Reporting Beliefs**

| Independent Variable | Positive Reporting Attitudes | Negative Reporting Attitudes |
|----------------------|-----------------------------|-----------------------------|
|                      | B   | β   | P Value | B   | β   | P Value |
| Condition            |     |     |         |     |     |         |
| Consequence-based marketing | 0.165 | 0.120 | .01    | -0.165 | -0.110 | .01    |
| Revised concussion education | -0.113 | -0.088 | .06    | -0.001 | -0.001 | .99    |
| Controls             |     |     |         |     |     |         |
| Lab 1 positive beliefs | 0.316 | 0.379 | <.001   | 0.491 | 0.528 | <.001   |
| Lab 1 negative beliefs |     |     |         | 1.203 | 0.528 | <.001   |
| Constant             | 3.185 | <.001 |         | 4.000 | 0.301 |         |
| R²                   | 0.182 |     |         | 64.809 |     |         |
| F                    | 33.427 |     |         | 64.809 |     |         |
| Pr(>|t|)              | <0.001 |     |         | <0.001 |     |         |
quences (or benefits) of concealing (or disclosing) a possible concussion. Our study was less about the specific claims we marketed and more about the process we used. Concussion knowledge is changing rapidly. Programs seeking to address the tendency of athletes to conceal possible concussion symptoms should translate research findings into compelling and yet accurate marketable statements and then communicate the benefits of disclosure and negative consequences of nondisclosure to motivate reporting behaviors.

Our research had limitations. The use of a relatively new population, club athletes, was a limitation because these athletes have not been studied as extensively as National Collegiate Athletic Association Division I, high school, or other more competitive-play athletes. Our participants were largely non-Hispanic whites; therefore, we cannot speak to how the findings might be different among more diverse samples. In addition, we examined the ability of social marketing to influence reporting beliefs. Although EVT suggests that changes in beliefs will lead to changes in behavior, our results did not directly address changes in behavior. Authors should explore actual concussion-reporting behaviors and determine how our findings apply to athletes at more competitive levels of play. We assessed young-adult athletes (aged 18–24 years). Researchers should determine whether the findings are similar among younger athletes.

CONCLUSIONS

Athletic trainers are often tasked with creating the conditions that support athletes in reporting concussion symptoms. The primary tool available to ATs has been educational material focused on the symptoms of a concussion. The social-marketing approach showing the consequences of not reporting a possible concussion and the benefits of early reporting provides ATs with another strategic tool in these efforts.

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