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HIV/AIDS AMONG AMERICAN INDIANS/ALASKA NATIVES LIVING IN MONTANA: A DESCRIPTIVE STUDY

K. Ann Sondag, PhD, CHES and Carrie Strike, MS

Abstract: This study examined the epidemiology of HIV among AI/ANs in Montana. Barriers to HIV testing and motivations to test also were explored. Analysis of data revealed that there were no significant changes in regard to HIV/AIDS case rates, demographic characteristics, or risk behaviors of AI/ANs infected with HIV/AIDS since reporting began in 1985. Barriers to testing included low perception of risk and fear of people finding out about the test. Despite major barriers to testing identified in this study, AI/ANs appeared to be testing at a higher rate than Whites.

INTRODUCTION

The HIV/AIDS epidemic has been one of the defining features of the past quarter-century. By the end of the 2006, over one million people in the U.S. alone had been infected with HIV. Three racial and ethnic minorities in the U.S.—African Americans, Hispanics/Latinos, and American Indians/Alaskan Natives (AI/ANs)—account for a greater proportion of HIV/AIDS cases than would be expected for their proportion of the population (Centers for Disease Control and Prevention [CDC], 2008). Despite the increased rates of infection in these populations, there is a lack information about how HIV/AIDS affects them and their communities. This lack of information is evident in AI/AN communities where many AI/ANs have expressed specific concerns about the quality of HIV/AIDS data that currently is available (National Alliance of State and Territorial AIDS Directors [NASTAD], 2008). This concern exists, in part, because the relatively low numbers of reported HIV/AIDS cases among AI/ANs nationwide belie the many factors that put them at increased risk for infection.

Vernon and Jumper-Thurman (2005) reviewed factors that may contribute to high rates of HIV infection among AI/ANs. Most salient are biological factors, such as increased rates of sexually transmitted diseases; social factors, such as homophobia and distrust in health systems; economic factors, such as poverty, which can inhibit access to good health care and health education;

socioeconomic factors related to gender inequality and violence; and substance use factors, which often are not direct routes of HIV transmission but do influence risky behaviors such as unprotected sex. While the combination of these factors has the potential to lead to high rates of infection (NASTAD, 2008; Hamill & Dickey, 2005; Bertolli et al. 2004), the reported rates of HIV among AI/ANs are not dramatically higher than those among Whites (CDC, 2010).

Many health professionals estimate the number of HIV/AIDS cases among AI/ANs to be much higher than what statistics currently report. Data sharing issues, racial misclassification, and misidentification and underreporting of HIV tests have been cited as possible reasons that national statistics regarding AI/AN populations may not reflect the extent of HIV/AIDS morbidity (NASTAD, 2008; Hamill & Dickey, 2005)—reasonable assumptions in light of the high prevalence of risk factors and risk behaviors within these populations.

One avenue for obtaining more accurate information about the prevalence of HIV/AIDS in AI/AN communities is to increase the numbers of individuals who get tested for HIV. The CDC (2010) estimates that one in five (21%) persons in the U.S. who are HIV-positive have not been tested and do not know their status. Nearly half (46.4%) of AI/ANs report they have never been tested for HIV (CDC, 2010). Unfortunately, numerous barriers inhibit people from being tested. There are individual factors (fear and discrimination); program policy or law factors (named reporting and inability to afford treatment); and counseling and testing factors (dislike of counseling, anxiety waiting for results, and venipuncture) that must be considered when determining why an individual might not go to a health facility to be tested (Spielberg et al., 2003). Using a rapid assessment model, Burks, Robbins and Durtchi (2010) explored barriers to testing among AI men identifying as gay, bisexual, or two-spirit or who had same-sex experiences. Barriers identified by individuals in this study included: limited hours of availability and inconvenient locations of testing sites; fear that “everyone is going to know” if one gets tested; not wanting to know one’s HIV status; shame and stigma associated with being HIV positive; and the belief among young people that they are invulnerable to HIV/AIDS.

These barriers are not new. Over a decade ago, research regarding HIV testing barriers specific to AI/AN populations revealed similar results—lack of knowledge about available testing services and inconvenient office hours at testing sites; concerns about lack of confidentiality; low perceived risk for getting HIV; and mistrust of local health departments (Duran et al., 2000; Mochi, 1997).

While HIV testing data and epidemiologic information about AI/ANs living with HIV/AIDS provide some insight into who is infected with HIV, there is a need to investigate these sources of information more closely. By examining 23-year trends found in HIV/AIDS epidemiologic data, gathering information about the demographic characteristics and risk behaviors of individuals

who have been tested for HIV, and examining barriers to testing among a convenience sample of Montana's AI/AN populations, we hope that this study will not only add to the understanding of the distribution of HIV/AIDS among Montana's AI/AN communities, but also illuminate the barriers to HIV counseling and testing (HIV C&T).

BACKGROUND

There are seven federally recognized reservations representing 11 different tribes in Montana: Blackfoot, Crow, Confederated Salish and Kootenai, Assiniboine, Gros Ventre, Sioux, Northern Cheyenne, Little Shell, and Chippewa-Cree (Montana Office of Public Instruction, 2009). AI/ANs living on the seven reservations and in urban areas represent approximately 6.4% of the nearly 975,000 individuals living in Montana (U.S. Census Bureau, 2010). Despite the size of Montana's AI/AN population, prior to this study, no formal assessment of the impact of HIV/AIDS among AI/ANs had been conducted in the state. Therefore, Montana's state HIV Prevention Community Planning Group (MT CPG), under the auspices of the Montana Department of Public Health and Human Services (MTDPHHS), contracted with researchers from The University of Montana to explore the feasibility of gathering information that would contribute to an understanding of the impact of HIV/AIDS among AI/ANs. The MT CPG membership has a strong AI/AN constituency. At the time of the assessment, 10 of the 35 members identified as AI/AN and were representative of tribes and communities throughout the state. In planning for the assessment, the researchers, in conjunction with the MTDPHHS, scheduled three meetings with the AI/AN members of the MT CPG. Six to eight AI/ANs representing five of Montana's seven reservations were present at the meetings. The goals of the series of meetings were to determine the specific purpose of the assessment; to decide who should lead and direct the assessment; and to determine how, when, and where data collection should take place. The group determined that the researchers would gather preliminary information and bring it to subsequent meetings.

Preliminary informal data gathering efforts included phone calls to all seven Indian Health Service (IHS) clinics in Montana. Researchers spoke with public health nurses at six of the seven clinics and explained that the purpose of the phone call was to inquire about the feasibility of working with IHS clinics to gather HIV testing information. Testing information would be used to assist the MT CPG in developing HIV prevention interventions for AI/ANs in Montana. Specific information about testing was not solicited at this time. Nurses were asked, however, for their "best guesses" regarding numbers of HIV tests given annually at the clinics. Estimated numbers of tests conducted at each clinic varied greatly from clinic to clinic. This information, along with information about teen pregnancy and STD rates among AI/ANs, was brought back to the group during the third meeting.

AI/AN MT CPG members organized a fourth meeting to discuss their role, and the role of the researchers, in the data collection process. During this meeting, the AI/AN MT CPG members decided that data gathering efforts would be best received by IHS and tribal leaders if representatives from each reservation took ownership of the process and gathered testing information specific to the reservation where they resided. As a result of this decision, the researchers chose to focus their efforts on collecting information from urban Indian centers and from state-funded testing sites with a history of testing high numbers of AI/ANs. The present assessment, therefore, was not designed to be a comprehensive examination of “all testing sites” in Montana. Rather, it was designed as an examination of state-funded sites that were required to report test results directly to the state public health department. The purpose of this assessment was to use multiple sources of information to contribute to an understanding of the distribution of HIV/AIDS among the AI/AN communities in Montana and to illuminate some of the challenges AI/ANs encounter when seeking to know their HIV status.

METHODS

To construct a more in-depth picture of the demographic characteristics and risk behaviors of individuals who were being tested for HIV, data from three existing sources and one new source were used. First, information from the CDC standardized counseling and testing intake forms for the year 2007, and from the 2007 Montana Behavioral Risk Factor Surveillance Survey (BRFSS), were examined. State of Montana epidemiological data were used to enhance understanding of the demographic characteristics and risk behaviors of AI/ANs living with HIV/AIDS in Montana. And finally, data from the 2008 Barriers to HIV Testing Questionnaire were examined. Approval from The University of Montana’s Institutional Review Board was obtained prior to data collection.

The Barriers to HIV Testing Questionnaire developed for this study included three sections: 1) demographic questions, 2) questions about barriers to HIV C&T, and 3) questions about motivations for seeking an HIV test. Categories and wording for demographic questions were taken directly from the MTDPHHS HIV C&T forms. Questions regarding barriers to and motivations for accessing an HIV test were adapted from an earlier University of Montana study assessing the barriers to HIV testing among four high-risk groups in Montana (Mochi, 1997), as well as from a review of the literature regarding barriers to HIV testing. The instrument was reviewed by staff at the MTDPHHS STD/HIV Prevention Section and by staff at each of the nine HIV testing sites chosen to distribute the questionnaires. A few minor edits were made to the questionnaire following the review. However, no major adaptations to the questionnaire were suggested by the reviewers.

Data Collection

The Barriers to HIV Testing Questionnaire was distributed to four MTDPHHS-funded testing sites. The state-funded sites were chosen based on numbers of AI/ANs who sought HIV C&T services in 2007; the five sites with the highest numbers were chosen. One site, however, declined to participate in the study. Staff at the MTDPHHS-funded sites asked all eligible AI/ANs over the age of 18 who came in for an STD and/or HIV test to volunteer to complete the questionnaire.

All five urban Indian centers in Montana also were asked to assist with questionnaire distribution. The HIV/STD Section Supervisor at the MTDPHHS sent an introductory letter to the urban Indian centers explaining the purpose of the assessment and asking clinics to participate. Following the letter, a researcher visited in person with staff at each of the centers to explain the purpose of the assessment, to describe procedures for distributing questionnaires, and to request the center's participation. Staff at the five urban Indian centers agreed to participate and consequently asked all individuals over the age of 18, regardless of the purpose of their health care visit, to volunteer to complete the questionnaire.

At all questionnaire distribution locations, individuals who chose to participate were given a packet containing an informed consent form, a two-dollar incentive, and a self-addressed pre-paid envelope. Participants were invited to complete the questionnaire at the clinic or finish it at a time more convenient for them and mail it to the researchers in the provided envelope.

Information for this assessment also was collected from three existing data sources. First, this study utilized information from existing HIV C&T intake forms. Montana HIV testing contractors utilize standardized machine-readable intake forms that were developed by the CDC in 1990 and revised in 2007. (The older version of the form, used through 2007, was the version included in this study.) Montana collects HIV C&T data, which are submitted directly to a CDC database via scanning software. These data are used to facilitate program monitoring and evaluation at the local, state, and national levels. Data taken from the form included: 1) client demographics, 2) HIV testing information, including specific test technology and test specimen type, 3) test results, and 4) client risk behaviors.

Second, information from the 2007 Montana BRFSS was analyzed. The BRFSS is a randomized telephone survey and is the primary source of state-based information on health risk behaviors among adult populations. For over 20 years, the BRFSS has been used to gather information from U.S. adults about a wide range of behaviors affecting their health, with a primary focus on behaviors that are linked to leading causes of death, including HIV/AIDS (CDC, 2009). The MT BRFSS includes three questions specific to HIV. The questions are: "Have you ever been tested for HIV?" "Where did you have your last HIV test?" and "Was it a rapid test where you could get

your results within a couple of hours?” Responses to the first two questions were used to provide a more comprehensive picture of HIV testing among AI/NA populations.

Finally, state epidemiologic data specific to AI/ANs were made available to the researchers. HIV/AIDS epidemiologic data are collected by the MTDPHHS on an ongoing basis. The state HIV epidemiologist worked with researchers to examine 23-year trends in the incidence and prevalence of HIV/AIDS among Montana’s AI/ANs.

A synthesis of information from all four data sources is provided in this paper. We report results, discuss key findings, and offer recommendations based on the conclusions drawn from this study.

DATA ANALYSIS

The study was intended to be descriptive; therefore, complex statistical analyses of the data were not performed. Rather, the researchers looked at actual counts and frequency of responses.

The researchers entered primary data from the Barriers to HIV Testing Questionnaire into the SPSS database for Windows. The demographic characteristics, barriers to HIV C&T, and motivations for testing reported by AI/ANs seeking health services at specific MTDPHHS-funded sites and urban Indian centers in Montana are reported descriptively. Actual counts and percentages are reported for all forced-choice questions. Information from open-ended questions was qualitatively analyzed using a content analysis method. Themes that arose from the content analysis of open-ended questions are reported along with supporting quotations from respondents.

Secondary data gathered from the standardized HIV C&T intake forms also were entered by the researchers into the SPSS database for Windows. The demographic characteristics and risk behaviors reported by AI/ANs seeking testing at specific MTDPHHS-funded sites are reported by actual count and percentage. In addition, data from two of the three HIV testing-related questions on the BRFSS were taken directly from the state Web site and used to provide information about the numbers of AI/ANs who reported receiving an HIV test and where they received the test. And finally, epidemiologic data were used to provide a more comprehensive picture of the incidence and prevalence of HIV/AIDS among Montana’s AI/ANs, and to provide additional information regarding the demographic characteristics of individuals living with HIV/AIDS. The state epidemiologist provided incidence and prevalence data for a 23-year period, as well as information regarding the risk behaviors of AI/ANs infected with HIV and living in Montana. Because actual case numbers were very low, data were aggregated into two- to five-year units to ensure confidentiality.

RESULTS

Primary Data

Barriers to HIV Testing Questionnaire Results

A total of 275 questionnaires were distributed among the nine sites. The number of questionnaires delivered to each site was based on site staff members' estimate of the number of questionnaires they might be able to distribute in a four month time period. Urban Indian centers requested a total of 175 questionnaires and returned 103 for a return rate of 59%. State-funded sites requested a total of 100 questionnaires and returned 54 for a return rate of 54%. Overall, of the 275 questionnaires distributed to sites, 161 were completed. Four questionnaires were removed from the analysis because the respondents did not meet the criteria of being over the age of 18, leaving 157 valid questionnaires for a total return rate of 57%.

Demographic characteristics

Females (n = 89) returned the questionnaire at a higher rate than males (n = 68). Ages ranged from 18 to 75 years, with the largest represented age group being 45 years or older (37%). Of all respondents, 90% reported being heterosexual. The remaining 10% reported their sexual orientation as bisexual, homosexual, uncertain, or other. The vast majority of the respondents (82%) reported living off reservation. Nine tribes were represented by the 137 respondents (87%) who reported being enrolled members of a tribe.

Barriers to HIV testing

The questionnaire's main purpose was to assess both real and perceived barriers to getting tested for HIV in Montana. The statement on the questionnaire read, "My reasons for NOT getting tested, or for waiting until today to get tested for HIV, include: (check all that apply)." This statement was followed by a comprehensive list of 26 barriers that was compiled from earlier studies. Barriers reported among both males and females were similar. The five barriers that were checked most frequently were:

- I am at low or no risk (reported by 43%);
- I am in a monogamous relationship (reported by 18%);
- I usually practice safe sex (reported by 14%);
- Fear of people finding out (reported by 14%); and
- I always practice safe sex (reported by 13%).

Three main themes evolved from responses to the open-ended question, “Can you suggest some ways in which this clinic could make it easier for American Indians to get tested for HIV/AIDS?” The themes are described below:

- Confidentiality was the number-one suggestion respondents wrote on the questionnaire. Most respondents simply wrote the word “confidentiality.” Some, however, expanded on the issue and explained why confidentiality was a barrier to testing. One respondent summed up the issue of confidentiality with these words: “Confidentiality is a huge issue. Any town in Montana is a fairly small community, smaller in Indian circles and you are bound to be related to or know someone who works at the clinics. I personally don’t use any services at the Indian center just because as soon as you walk in you see someone you know and they immediately start questioning your reason for being there. I get calls from my family members asking why I was there because they’ve already heard about it.”

- The need to promote HIV testing also was a common response to the open-ended question. Several respondents mentioned the need to “get the word out” about where, when, and who should be tested. One person wrote, “There needs to be more TV ads, magazine ads, etc. for Indian country.” Another said, “Post notes and fliers at the colleges of upcoming events and clinics. Some Indian students from out of town might not know where the Indian center is or might not know there is one.”

- The importance of incentives as a motivating factor, the need for rapid testing technology, and the need to offer HIV testing during the annual exam to make it more accessible, also were offered as suggestions. One respondent wrote, “Indians love free incentives! Nobody likes to pay, but we love free stuff.” Another individual wrote, “Offer the test for free or ask during annual exams or physicals.”

In an effort to determine if barriers to HIV testing in Montana had changed over time, data from this study were compared with the only other available information specific to AI/AN testing barriers in Montana. Mochi, in 1997, distributed approximately 600 questionnaires to AI/AN health educators in four regions of the state. The health educators were asked to give the questionnaires to a convenience sample of AI/ANs over the age of 18 who were living on reservations in those regions. Completed questionnaires were mailed directly to the researcher in a self-addressed, stamped envelope that was provided. The number of questionnaires that were actually given to members of the target population was not recorded; however, sixty-seven were completed and returned to the researcher. Table 1 below illustrates the percentage of individuals who reported each barrier in 1997 and 2008, and adds to our awareness of the changing nature of HIV testing barriers in Montana over the past 14 years.

Table 1
Barriers to Testing: Comparison of 1997 and 2008 Results*

Barriers to Testing*	1997 Questionnaire (n = 67)	2008 Questionnaire (n = 157)
I am not at risk for HIV/AIDS	56.0% (38)	43.2% (68)
I always practice safe sex	25.4% (17)	13.0% (20)
I usually practice safe sex	34.3% (23)	13.7% (21)
Fear of people finding out	25.4% (17)	13.7% (21)
Not sure where to get tested	23.9% (16)	9.7% (8)
Do not trust Health Department	23.9% (16)	5.5% (8)
In a monogamous relationship	23.9% (16)	18.1% (28)

*Respondents were asked to "check all that apply"

Motivation for testing

Thirty-seven individuals who visited the MTDPHHS-funded sites and completed the Barriers to HIV Testing Questionnaire indicated on the questionnaire that the purpose of their visit was to receive an HIV test. Those individuals were asked to report their motivation for seeking the test. The five most frequent responses are listed below. Respondents were asked to "check all that apply."

- Knowing my status helps me feel safe (reported by 50%);
- I had unprotected sex (reported by 38%);
- I am getting paid to test (reported by 16%);
- It is part of my yearly checkup (reported by 8%); and
- I am pregnant (reported by 5%).

SECONDARY DATA

HIV C&T Intake Forms Results

All HIV C&T intake forms submitted by testing sites to the state from January 1, 2007 through December 31, 2007 were made available to the researchers by the HIV/STD Section of the MTDPHHS. All forms indicating "AI/AN" as race (992 of 5,630 total) were sorted and used to extract demographic and risk behavior information of AI/ANs who received an HIV test from state-funded sites. Of the 992 testing forms available, 756 (76%) indicated the name of the testing site. An examination of the number of tests administered at each site revealed that four sites administered 83% of 756 tests given to AI/ANs. The testing site at Salish Kootenai College on the Flathead

Reservation administered the greatest number of tests (248). Two testing sites in Yellowstone County—RiverStone Public Health Department and the Yellowstone AIDS Project—administered 140 and 102 tests, respectively, and the Cascade City-County Health Department administered 135 tests. The remaining 13 testing sites recorded significantly smaller numbers of tests for individuals who identified as AI/AN – numbers of tests for those sites ranged from 1 to 40.

Demographics

Males comprised a larger percentage of the total tests than females, with 53% of tests indicating male and 47% of tests indicating female at state-funded sites in 2007. Ages ranged from 14 to 78 years. The mean age of those tested was 32, while the most frequently reported age was 26. Fifty-eight percent of all respondents had been tested for HIV in the past.

Risk Behaviors

Only 10% of those being tested did not report engaging in behaviors that put them at risk for HIV; 90% had participated in one or more behaviors placing them at a higher risk for infection. The majority of individuals, both male and female (53%, n = 521), reported having sex with a person of unknown HIV status as the biggest risk factor for HIV/AIDS. Table 2 below identifies the ten most frequently reported risk behaviors.

**Table 2
Risk Behaviors**

Risk Behaviors	Male (n = 521)		Female (n = 469)		Total (n = 990)	
	%	n	%	n	%	n
Sex (vaginal or anal) with male	18%	95	93%	436	54%	531
Sex (vaginal or anal) with female	76%	396	10%	47	45%	443
Sex with a person of unknown HIV status	51%	269	53%	252	53%	521
Sex while intoxicated and/or high on drugs	49%	254	49%	230	49%	484
Sex with an anonymous partner	29%	149	27%	128	28%	277
Sex with a person who is an injection drug user	19%	97	25%	115	21%	212
Injection drug use	17%	91	20%	94	19%	185
No risks identified	11%	59	10%	48	10%	107
Sex in exchange for drugs or money	9%	48	7%	33	8%	81
Sex with a person who exchanges sex for drugs or money	6%	36	7%	32	7%	68

Risk behaviors most frequently associated with HIV infection in Montana include being male and having sex with men (MSM), injection drug use (IDU), both MSM and IDU (MSM/IDU), and having sex with someone who injects drugs (MTDPHHS, 2009). Percentages of AI/ANs who reported those behaviors and were tested at public testing sites are listed below:

- 18% (n = 95) of males reported MSM
- 19% (n = 185) of individuals reported IDU
- 21% (n = 212) of individuals reported having sex with a person who uses injection drugs.

Monetary Incentives to Test

Of the 975 forms that indicated whether an incentive was offered to encourage people to be tested for HIV, 516 (53%) indicated that the person who received the test was offered an incentive. The testing site at Salish Kootenai College conducted nearly 30% of the total number of tests reported to the MTDPHHS that were received by AI/ANs in 2007. Incentives were offered to 98% of individuals who were tested at that site. Incentives were advertised through posters and electronic social networking systems (e.g., Facebook), and consisted of gift cards valued at \$10 to \$20 for area discount or grocery stores. Individuals were given the incentive after completing both the HIV test and an exit survey (N. Graham, personal communication, February 16, 2011).

Behavioral Risk Factor Surveillance System Results

The BRFSS slightly oversampled AI/ANs to ensure that the weighted frequencies approximated the population proportion. Data for 2007 were obtained to determine the number of AI/ANs who reported having been tested at all testing sites, whether public or private. Information from the BRFSS indicated that AI/ANs were testing at a greater rate than were Whites (39% vs. 31%, respectively). In response to the question “Where did you have your last HIV test?” over 80% of Whites and AI/ANs reported receiving their tests at one of four major sites. Percentages of individuals tested at those sites are listed in Table 3 below (MTDPHHS, 2007).

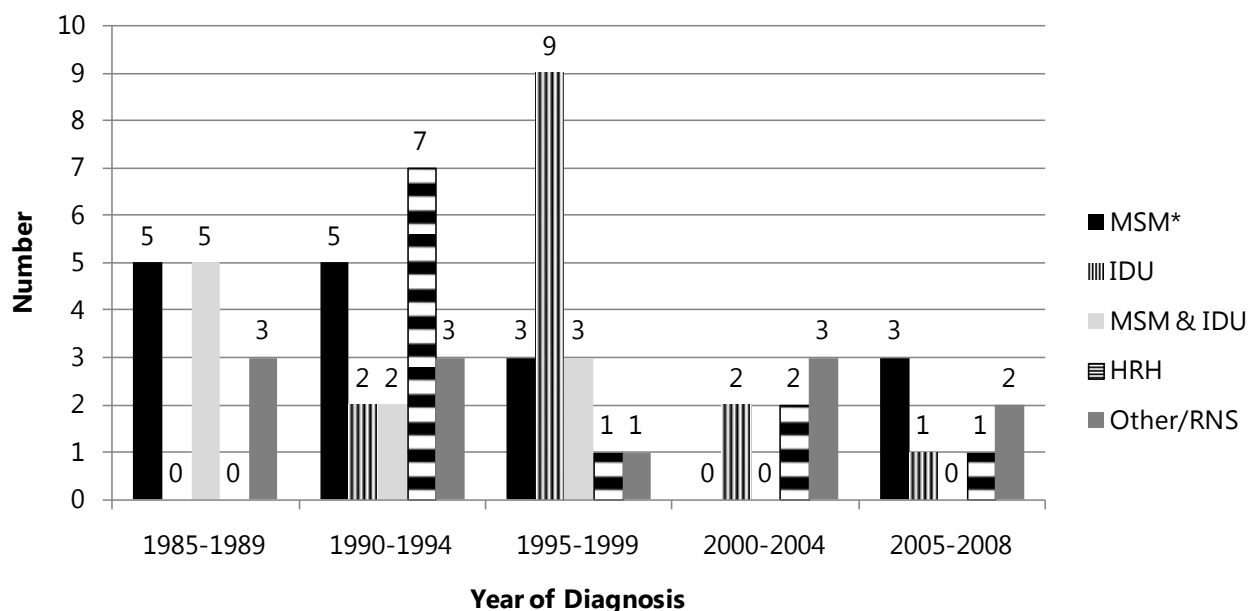
**Table 3
Testing Sites**

HIV Testing Site	AI/AN		White, Non-Hispanic	
	%	n	%	n
Clinic	32.4%	49	29%	297
Hospital	28.8%	35	17.1%	203
Private Doctor or HMO	19.9%	20	29.6%	347
Drug Treatment Facility	8.7%	10	1.7%	13

Epidemiological Data Results

As of December 31, 2008, a total of 895 cases of HIV/AIDS had been reported to the MTDPHHS; of those, 63 were among AI/ANs or mixed-race AIs. Of those 63 cases, 33 people are currently living. Males comprise 71% (n = 45) of the cumulative cases, with MSM representing the highest percentage (58%) of the male cases. Females comprise 29% (n = 18) of the cumulative cases, with “risk not specified” representing the highest percentage (55%) of the female cases (MTDPHHS, 2009). Because of the low numbers of cases per year, Figure 1 shows the combined 4- and 5-year rates of HIV by mode of exposure.

Figure 1
Number of Reported HIV/AIDS Cases - Mode of Exposure, 1985-2008



* MSM = Men who have sex with men; IDU = Injection drug Use; HRH = High-risk heterosexual; RNS = Risk not specified

From 1985 to 2008 the number of individuals newly diagnosed with HIV decreased from ten between 1990 and 1992 to five between 2006 and 2008. Epidemiologic data indicate that the mode of exposure to HIV among AI/ANs has remained relatively constant. Table 4 compares cumulative cases (1985 to 2008) to current living cases and reveals no noteworthy changes in the epidemic in the past 23 years (J. Frazier, personal communication, October 10, 2008).

Table 4
Comparison of Cumulative and Living HIV/AIDS Cases

Epidemiological Report: HIV/AIDS Cases	Cumulative Cases (n = 63)	Living Cases (n = 33)
Age:		
25 to 44 years old	60%	58%
Gender:		
Male	71%	67%
Mode of exposure:		
Male - MSM and MSM/IDU*	58%	54%
Female - HRH and RNS*	83%	72-100%**
Montana counties w/greatest # of positive reported cases	Yellowstone Missoula	Yellowstone Missoula

*MSM = Men who have sex with men; IDU = Injection drug use;

HRH = High-risk heterosexual; RNS = Risk not specified

**Note: If frequency <5, specific numbers are not reported and percentages are approximate

DISCUSSION

One of the primary purposes of this study was to add to the understanding of the distribution of HIV/AIDS among Montana’s AI/AN communities. The following section highlights information from state epidemiologic data that contributes to our knowledge of the infection among AI/AN people in Montana.

Prevalence of HIV/AIDS among AI/ANs in Montana

Current Montana epidemiologic data indicate that HIV/AIDS does not appear to have a disproportionate impact on Montana’s AI/AN populations (MTDPHHS, 2009). While the national case rates of HIV/AIDS among AI/ANs have increased slightly each year since 2003 (NASTAD, 2008), the number of cases reported among AI/ANs in Montana has annually remained constant or shown a slight decline each year since 1990. Montana’s relatively low case rate and the decline in cases since 1990 have led many health professionals to speculate that there is substantial underreporting of HIV/AIDS cases in these populations. One explanation for this potential underreporting may be that significant barriers to HIV testing exist among AI/ANs in rural areas (Rural HIV/STD Prevention Workgroup, 2009, pg. 39). Low testing numbers among AI/ANs could result in undetected cases of HIV/AIDS and, thus, in deflated case rates. The current study explored

this supposition by examining data regarding barriers to testing from the Barriers to HIV Testing Questionnaire, the HIV C&T intake forms, and the BRFSS Survey.

HIV C&T among AI/ANs in Montana

Examination of HIV C&T intake forms for the year 2007 revealed that, of the 5,630 total HIV tests administered at Montana's state-funded public testing sites, 18% (992) were administered to individuals who indicated AI/AN as their race. This finding was unexpected and indicated that the rate of testing at state-funded sites was approximately 16 per 1000 for AI/ANs, in contrast to a rate of approximately 5 per 1000 for Whites. It is important to note, however, that the HIV C&T forms represent tests conducted only at state-funded public HIV testing sites. To more accurately estimate the rate of testing among AI/ANs, it was necessary to account for individuals who were tested at private health care settings. Fortunately, the BRFSS asks respondents about HIV testing at all sites, both private and public. Information from the BRFSS was consistent with national data (CDC, 2010) and data from the HIV C&T forms in that it indicated that the rate of HIV testing reported among AI/ANs was higher than the rate reported among Whites. Interestingly, approximately one-third of both AI/ANs and Whites reported receiving their last HIV test at a clinic. One slight difference in reported testing sites, as might be expected, was that a greater proportion of Whites tested at private doctors' offices or HMOs, while AI/ANs had proportionately higher testing rates at hospitals (MTDPHHS, 2007). Unfortunately, data from tribal clinics and IHS testing sites on the reservations were unavailable. It is likely, however, that the random sample survey methods employed by the BRFSS captured some of the individuals who tested at tribal and IHS clinics. It appears, therefore, that AI/ANs are not underrepresented in the HIV C&T data that are reported to the state public health department in Montana.

Members of Montana's State HIV Prevention Community Planning Group have expressed concern that HIV testing efforts throughout the state are not reaching the populations most at risk for infection (L. Kops, personal communication, February 4, 2008). In this study, information taken from the HIV C&T forms was used to examine that concern. Approximately 90% of individuals who completed the state HIV C&T testing form in 2007 reported engaging in at least one behavior that put them at risk for HIV infection. Nearly 20% reported engaging in behaviors that placed them in one of the top four behavioral risk categories for HIV infection: MSM, IDU, MSM/IDU, and sex with someone who uses injection drugs (MTDPHHS, 2009). Nearly 30% of individuals who tested at public sites reported engaging in anonymous sex. Even though the C&T intake forms do not distinguish between protected and unprotected sex, there appears to be a substantial number of individuals who are getting tested for HIV and who are reporting multiple risk factors, including injection drug use and/or engaging in risky sexual behavior.

HIV C&T Barriers among AI/ANs in Montana

A second major purpose of this study was to explore the barriers to HIV testing. It is especially critical to break down barriers to testing in AI/AN communities because of the health care disparities they face. A study conducted by Kaufman et al. (2007) showed that testing is particularly important among AI/ANs, as these populations experience a faster progression from HIV diagnosis to AIDS than any other racial group in the U.S. They also experience some of the lowest survival rates after diagnosis. In 2001, 48% of AI/ANs diagnosed with HIV were subsequently diagnosed with AIDS within 12 months, compared with 40% for the general population (Kaufman et al., 2007). One potential explanation for this phenomenon is that AI/ANs delay HIV testing until they develop symptoms associated with AIDS. Early testing for HIV could improve survival rate of AI/ANs infected with the virus. It is important, therefore, to assess the barriers to testing and reduce or eliminate those barriers if possible.

In the present study, the number-one barrier to testing, as reported by the 157 individuals who completed the Barriers to HIV Testing Questionnaire, was “not being at risk for HIV/AIDS.” Interestingly, 14 years ago, the only other study that examined barriers to HIV testing on Indian reservations in Montana also found that “not being at risk for HIV/AIDS” was the number-one barrier to testing (Mochi, 1997). This perception may be reasonable given the relatively low incidence of HIV/AIDS among AI/ANs in Montana. One major difference between the barriers reported in the 1997 study and in the current study related to distrust of the health department. In 1997, nearly 24% of the respondents reported that they did not trust the health department, while in the current study, only about 6% reported distrust as a barrier to receiving an HIV test. This difference may reflect a more positive relationship between AI/ANs and county public health departments in the past 14 years, or it may reflect current respondents’ reluctance to admit to a distrust of public health departments. More likely, however, it reflects a difference in the populations that were assessed in the two studies. Participants in the 1997 study lived on reservations, while most of the participants in the current study lived in more urban areas. It seems plausible, therefore, that AI/ANs living off reservation may have greater exposure to and contact with the majority culture, and may have adapted their behavior and thinking to more closely match the prevailing view that health departments are safe places to receive preventive health services. Acculturation may be responsible, not only for the possible greater trust in health departments, but also for the dramatic decrease from 1997 to 2008 in the percentage of individuals who reported “not knowing where to get tested.”

Another interesting change in the past 14 years is in the number of people who reported “usually or always practicing safe sex” as barrier to testing. In 1997, approximately 60% of questionnaire respondents reported that they did not seek an HIV test because they “usually or

always practice safe sex.” In 2008, the percentage of individuals reporting the same barrier declined by nearly one half. There are several ways to interpret this difference. It may simply be that since 1997 fewer AI/ANs are practicing safe sex, or that AI/ANs living on reservations are more likely to practice safe sex than individuals living off reservations. An equally reasonable explanation, however, is that the actual rates of AI/ANs practicing safe sex have not changed significantly over time, but respondents in the 2008 study simply did not indicate on the questionnaire that “usually or always practicing safe sex” was a reason to forgo HIV testing.

Examination of HIV C&T forms revealed a surprising number of HIV tests administered at state-funded sites to individuals who identified as AI/AN. The fact that many AI/ANs choose to get tested at state-funded sites may be related, in part, to the barrier “fear of people finding out.” This fear appears to be common in smaller communities—both on and off reservations. “Fear of people finding out” was mentioned as a barrier to getting an HIV test by many individuals who completed the Barriers to HIV Testing Questionnaire. It makes sense, therefore, that three of the four sites recording the greatest number of HIV tests administered to AI/ANs were located in the largest cities in Montana’s Yellowstone and Cascade counties. These more urban HIV testing sites provide much-needed anonymity for individuals who reside in small rural communities in Montana.

In addition to reducing barriers to testing, it is also important to understand an individual’s motivation for seeking an HIV test. Of the respondents in this study who visited an urban Indian or a public health clinic for testing and completed the Barriers to HIV Testing Questionnaire, nearly half reported they tested because “knowing their status helped them to feel safe.” Over one-third of the questionnaire respondents were motivated to test after having unprotected sex, while nearly one-sixth reported being motivated to test because they were offered an incentive. The important role of incentives as a motivating factor in seeking an HIV test is most apparent in the data gathered from the HIV C&T intake forms, where approximately half of individuals who tested at state-funded sites reported being offered a monetary incentive to test. Seventy percent of those incentives were given to individuals who were tested for HIV at the Salish Kootenai College testing site on the Flathead Reservation—a site that administered approximately one-third of all tests given to AI/ANs at state-funded sites. While receiving a gift certificate to a discount and/or grocery store, in and of itself, may motivate individuals to get an HIV test, it is possible that receiving an incentive encourages individuals to get tested because it reduces the stigma of HIV testing. If individuals are asked by family or friends why they were motivated to test, they can attribute their motivation to their desire for an incentive rather than to their participation in high-risk behaviors such as injection drug use or unprotected sex. Awareness of both motivations for and barriers to testing can be useful for health professionals who are developing interventions designed to increase the number of AI/ANs who are knowledgeable about their HIV status.

LIMITATIONS OF THE STUDY

There are several important limitations regarding the data collected for this study.

Barriers to Testing Questionnaire

Data collected from the questionnaires were self-reported. Information was dependent upon participants' memory of previous experiences and willingness to answer questions honestly. Furthermore, distribution of questionnaires was dependent on health clinic workers at the participating sites. The questionnaire only represents responses of the volunteers and cannot be applied to AI/AN populations as a whole. Data also do not represent all possible testing sites available in Montana.

HIV C&T Intake Forms

The HIV C&T intake forms were supplied by the HIV/STD Section of the MTDPHHS. Individuals who conduct tests at state-funded sites are required to complete the forms to comply with the CDC surveillance regulations. Individuals who perform tests at IHS sites or tribal health clinics on reservations, as well as those who perform tests at private sites both on and off reservations, are not required to complete the CDC forms. Thus, data from the forms do not represent all AI/ANs who received an HIV test in 2007. Nor do the forms provide information about respondents' area of residency; therefore, we were unable to determine whether urban, rural, and reservation residents face different barriers to testing. Further research is recommended to investigate this possibility. In addition, the accuracy of the information on the forms is dependent on clients' ability and willingness to self-report past behaviors.

Behavioral Risk Factor Surveillance System

The BRFSS is an ongoing telephone survey conducted by the MTDPHHS in collaboration with the CDC, and is the primary source of state-based information on health risk behaviors among the adult population (MTDPHHS, 2007). To account for limitations of gathering data through a telephone interview, final data from the BRFSS are weighted, taking into account four factors: the basic probability of selection among subsets of area code/prefix combinations, the number of adults in the respondent's household, the number of telephones in the household, and the number of people in an age-by-sex or age-by-race-by-sex category in the population of the state. The weights for each relevant factor are multiplied together to get a final weight (CDC, 2009). Even after taking into account weighted data, it is possible this data set does not accurately represent the entire AI/AN population in Montana.

Epidemiological Data

Montana's state epidemiologic report only includes cases of HIV/AIDS reported in Montana. There may, in fact, be HIV-positive individuals residing in the state who reported positive elsewhere. Furthermore, sample sizes remain a limitation in states like Montana with low case rates. When data are stratified, numbers may become extremely small. The addition of one case may show a large percentage difference between strata, when there is no significant or practical difference.

CONCLUSIONS

This study was an attempt to examine multiple sources of information regarding HIV/AIDS among AI/ANs in Montana and to use that information to gain further understanding of the epidemic as it exists in AI/AN populations. Four sources of data were reviewed: the Barriers to HIV Testing Questionnaire, CDC standardized HIV C&T intake forms, information on HIV testing from the BRFSS, and state of Montana epidemiologic data. It is worthwhile to remind readers that HIV testing data collected for this assessment focused on urban Indian centers and on testing sites that receive funding from the state public health department. The conclusions drawn from this study should, therefore, be examined in light of the limitations discussed above.

The CDC recently announced a significant decline in the HIV transmission rates nationwide (CDC, 2008). The decline in transmission rates is evident in Montana's AI/AN populations. A review of cases from 1985 to 2008 reveals that the number of individuals newly diagnosed with HIV decreased from ten between 1990 and 1992 to five between 2006 and 2008. Furthermore, state epidemiologic data described in this study reveal few major changes in the character of the HIV/AIDS epidemic over time. Risk behaviors, gender, and age of individuals infected with HIV remain fairly constant.

The decline in incidence and the relatively low number of HIV/AIDS cases among AI/ANs do not appear to be the result of lack of testing. In fact, HIV testing data from state-funded sites and state BRFSS data indicate that not only are AI/ANs in Montana getting tested at greater rates than Whites, but also that testing sites are being utilized by individuals who have increased risk for infection. Data from HIV C&T intake forms completed at state-funded sites revealed that approximately 90% of AI/ANs who were tested at these sites listed at least one risk factor for HIV infection. A substantial proportion of those who were tested reported behaviors corresponding with the highest behavioral risk categories—MSM and IDU.

While we applaud the decreasing transmission rates among AI/AN populations in Montana, we must remain vigilant in our prevention efforts. Unfortunately, there are many barriers to ongoing prevention efforts. Primary among these barriers is the low perception of risk for HIV infection

among AI/ANs, despite strong indicators that many individuals are engaging in behaviors that place them at risk. NASTAD (2008) notes that even health care professionals have a difficult time accepting the importance of HIV/AIDS prevention work when there are few reported cases and many other major health challenges affecting AI/AN populations that require attention. One potential strategy for overcoming this barrier is to integrate HIV prevention education into broader programs that already have culturally appropriate infrastructure in place and where similar behaviors are addressed (e.g., STD and teen pregnancy education and prevention programs). In Montana, where teen pregnancy (MTDPHHS, 2008) and STDs rates are high (MTDPHHS, 2010) and HIV rates are relatively low, young people may find more relevance, and therefore be more receptive, to messages that combine HIV prevention information with STD and pregnancy prevention information.

“Fear of people finding out” has long been a barrier to accessing HIV prevention and testing services. In Montana, this issue has been addressed in several ways. Individuals who are trained to administer HIV tests take their testing services to places where AI/ANs gather socially. Community events both on and off reservations are frequently attended by outreach workers who offer HIV testing in conjunction with preventive services related to other important health issues such as STDs or Hepatitis C. As part of these outreach efforts, an incentive for HIV testing often is offered. The incentive serves to motivate individuals to be tested and also may reduce the stigma of getting an HIV test by offering high-risk individuals an alternative explanation for receiving a test. Receiving a test at a large urban testing center also appears to mediate the “fear of people finding out.” Such testing centers appear to offer more anonymity and inspire confidence that the visit will be kept confidential.

Another significant barrier to HIV prevention among AI/ANs in Montana is the high rate of substance use. In this assessment, examination of risk behaviors reported on HIV C&T forms revealed that nearly one half of individuals receiving an HIV test reported having sex while intoxicated or on drugs. Since behaviors associated with substance use have been linked with the transmission of HIV, it seems important to incorporate HIV/AIDS prevention education into existing substance use prevention and/or treatment programs on and off reservations. Recommendations for integrating prevention programs by pooling resources, targeting individuals whose behaviors place them at highest risk, and increasing the relevance of HIV prevention messages by combining them with messages related to more salient health issues (e.g., teen pregnancy, STDs, substance abuse) are particularly relevant for AI/ANs communities in rural, low-incidence states like Montana where resources are extremely limited and where low perception of risk is an impediment to the promotion of HIV prevention behavioral risk reduction.

We hope that the information gathered in this assessment will add to readers' understanding of the impact of HIV/AIDS on AI/ANs living in Montana. Unfortunately, the picture drawn by this assessment is incomplete. In order to complete the picture, future research should include information about HIV testing and barriers specific to each reservation. Building positive relationships that foster information sharing among tribal programs, urban Indian centers, IHS, the state's communicable disease surveillance program, and researchers should be an important component of future research. Working together, these diverse entities will be able to provide a more in-depth understanding of the impact of HIV/AIDS among all AI/ANs in Montana

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DOES PEDOMETER GOAL SETTING IMPROVE PHYSICAL ACTIVITY AMONG NATIVE ELDERLY? RESULTS FROM A RANDOMIZED PILOT STUDY

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Abstract: We examined if step-count goal setting resulted in increases in physical activity and walking compared to only monitoring step counts with pedometers among American Indian/Alaska Native elders. Outcomes included step counts, self-reported physical activity and well-being, and performance on the 6-minute walk test. Although no significant between-group differences were found, within-group analyses indicated that elders significantly improved on the majority of step count, physical activity, health-related quality of life, and 6-minute walk outcomes.

INTRODUCTION

Escalating rates of physical inactivity in the general U.S. population are a major public health concern (National Center for Health Statistics, 2003), with American Indians/Alaska Natives (AI/ANs) reporting among the lowest levels of leisure-time activity and exercise relative to all other racial/ethnic groups (Belza et al., 2004; Centers for Disease Control and Prevention [CDC], 2004; 2005; Coble & Rhodes, 2006; Crespo, Smit, Anderson, Carter-Pokras, & Ainsworth, 2000). Studies using objective measures of physical activity have also noted that the majority of AI/ANs fail to meet recommended levels of physical activity set forth by the CDC and the American College of Sports Medicine (Storti et al., 2009). Physical inactivity is an established risk factor for obesity, hypertension, diabetes, and cardiovascular disease, all of which are prevalent health problems among older AI/ANs (Galloway, 2005; Liao, Tucker, & Giles, 2004).

Interventions designed to promote physical activity can be associated with improvements in disease risk factors and chronic medical conditions (Miller, Balady, & Fletcher, 1997; Whelton, Chin, Xin, & He, 2002). Walking is among the most preferred forms of exercise for adults (CDC, 2004; Rafferty, Reeves, McGee, & Pivarnik, 2002) and is an ideal physical activity for sedentary

or older individuals given its availability and low risk for injury (Eyler, Brownson, Bacak, & Housemann, 2003; Hootman et al., 2001). Several community (Baker et al., 2008; Iwane et al., 2000; Merom et al., 2007; Sequeira, Rickenbach, Wietlisback, Tullen, & Schultz, 1995; Stovitz, VanWomer, Center, & Bremer, 2005) and workplace (Dishman, DeJoy, Wilson, & Vandenberg, 2009) studies have explored the use of pedometers as a portable, inexpensive method to increase physical activity among inactive populations. The step-counting function of pedometers can also be used to motivate individuals to increase physical activity, especially when they are encouraged to record daily step counts and set specific step-count goals (Farmer, Croteau, Richeson, & Jones, 2006; Hultquist, Albright, & Thompson, 2005; Moreau et al., 2001). A recent meta-analytic study concluded that pedometer users increase their overall levels of physical activity by approximately 27% from baseline, older populations reduce body mass index significantly, and users who set a step-count goal also reduce body mass index significantly (Bravata et al., 2007).

A previous randomized trial to increase physical activity among AI/AN elders in primary care compared those who monitored their daily physical activities with those who monitored their daily physical activities with the use of a pedometer (Sawchuk et al., 2008). Both groups were given a booklet that contained daily self-monitoring forms to track their physical activities. Although no between-group differences were found on self-reported and behavioral measures of physical fitness and exercise, all participants reported significant increases in the frequencies of leisure walking, all exercise activities, and exercises of moderate intensity. Furthermore, all participants also increased their weekly caloric expenditure for all exercise-related activities over the course of the study. None of the participants, however, were specifically instructed in activity goal setting, which has been found to be an important factor in increasing activity in other studies (Bravata et al., 2007).

Therefore, we conducted a pilot study using pedometers to increase walking, physical activity, and fitness levels over 6 weeks in a newly recruited sample of older AI/AN primary care patients. All elders were given pedometers and basic instruction in physical activity monitoring and recording daily step counts in a diary; half were also instructed to increase their step counts by at least 5% each week. We hypothesized that all elders would report significant increases in self-reported physical activities and well-being, and enhanced performance on the 6-minute walk test of fitness from baseline to the 6-week assessment. Furthermore, we predicted that elders in the goal-setting group would report significantly greater increases in these outcomes relative to their counterparts who did not receive any instruction in setting step-count goals.

METHODS

Participants and Procedures

All pilot study procedures were conducted between May and November 2007 at the Seattle Indian Health Board, a large urban primary care medical facility for AI/ANs in the greater metropolitan Seattle area. Elders were recruited through advertisements in the primary care clinics, Native health fairs, and by word of mouth. Potential participants were screened for age and AI/AN race prior to completing a brief telephone interview to determine final study eligibility. Inclusion criteria included 1) being 50-85 years of age, 2) reporting a sedentary lifestyle, assessed by responding “no” to the question “Have you been physically active for the past 6 months?” 3) being able to walk without assistance, 4) denying medical contraindications to walking, 5) having access to a phone for weekly contacts, and 6) living within a 2-hour drive from the study site. Of note, the term “elder” is acceptable in many AI/AN cultures, communities, and families for individuals aged 50 years and older as it denotes a certain status within the community beyond that of chronological age. Approvals for this pilot study were obtained from both the Human Subjects Division at the University of Washington and the Privacy Board at the Seattle Indian Health Board.

All participants completed two face-to-face 60- to 90-minute study visits with a research assistant at the Seattle Indian Health Board, spaced 6 weeks apart. All participants also received 5- to 10-minute phone calls each week from the research assistant. The purpose of these calls was to bolster continued participation in the study, address any study-related concerns, engagement with physical activity and exercise, and reaffirm the date and time of their final study visit. For participants in the step-count goal-setting group, time was spent setting a new weekly step-count goal of 5% above their previous week’s average.

During the first visit, the study purpose and procedures were verbally described to the participant, and written informed consent was obtained. A structured interview was conducted to collect additional demographic and medical information, followed by completion of self-report measures of physical activity and health-related quality of life. The research assistant measured each participant’s height and weight, and then randomly assigned each individual to either the monitoring only (MO) or the goal-setting (GS) group. Allocation to the study groups was determined by an independent statistician using a random number table, with elders block randomized by body mass index.

All participants were trained in the use of a pedometer, shown how to read the step counter, and shown how to record their total daily step count on the activity-monitoring forms. GS participants were given additional instruction to use the first week as a baseline to assess their average weekly step count; they were also instructed that each subsequent week would involve setting a goal to

increase their weekly step count totals by 5%. Weight and stride length were used to calibrate the pedometer for each individual participant. We then assessed general health status and ambulatory functioning, resting oxygen saturation, heart rate, and blood pressure, and obtained the Borg-Dyspnea scale prior to completing the 6-minute walk test of fitness. Following completion of the 6-minute walk, all participants were compensated with a \$40 grocery gift card. After completing the week 4 telephone call, all participants were mailed another \$40 grocery gift card for compensation.

At the second visit, the research assistant reviewed the daily activity-monitoring forms, re-administered the self-report measures on physical activity and health-related quality of life, and reassessed height and weight. Changes in health status and ambulatory functioning since starting the study, resting oxygen saturation, heart rate, blood pressure, and the Borg-Dyspnea scale were measured prior to completing the 6-minute walk. Following completion of the walk, participants were debriefed and compensated with a \$60 grocery gift card.

Self-reported Physical Activity and Health

All participants were given a booklet that contained daily self-monitoring physical activity forms, including a space for recording their total daily step counts. We calculated a weekly step count average for each participant as a means of assessing the effectiveness of the goal-setting manipulation.

The Community Healthy Activities Model Program for Seniors (CHAMPS) Questionnaire is a 41-item measure assessing a range of light, moderate, and vigorous physical activities in leisure, work, exercise, and chore-related domains (Stewart et al., 1997). Respondents report their weekly frequency and duration of participation in activities over the previous 4 weeks, yielding 4 primary summary scores: total weekly caloric expenditure for all exercise activities; total weekly caloric expenditure for moderate-intensity exercise-related activities; weekly frequency of all exercise-related activities; and weekly frequency of moderate-intensity exercise-related activities. The CHAMPS has excellent psychometric characteristics and has been used extensively with older adults as an outcome measure for physical activity interventions (Harada, Chiu, King, & Stewart, 2001; Stewart et al., 2001), including with AI/AN elders (Sawchuk et al., 2008).

The Short Form-36 of the Medical Outcomes Survey (SF-36) is a 36-item measure of health-related quality of life across 8 domains: Physical Functioning, Role-Physical (i.e., difficulties with work or daily activities secondary to physical health problems), Bodily Pain, General Health, Vitality, Social Functioning, Role-Emotional (i.e., difficulties with work or daily activities secondary to emotional health problems), and Mental Health (Ware & Sherbourne, 1992). Two higher-order component summary scores (mental and physical component scores) are derived from the 8 scales of the SF-36. Respondents rate their health-related functioning over the last 4 weeks. The SF-36 has

well-established reliability and validity (Ware & Sherbourne, 1992), and has been used with diverse patient populations (Schlenk et al., 1998; Yost, Haan, Levine, & Gold., 2005), elderly (Chapman, Duberstein, & Lyness, 2007; Hu, 2007; Wolinsky, Wan, & Tierney, 1998), and AI/AN samples (Beals et al., 2006; Johnson, Nowatzki, & Coons, 1996; Sawchuk et al., 2008).

We also asked participants to report on the presence or absence of the following health conditions: arthritis/osteoporosis, asthma, cancer, diabetes, heart disease/stroke, hypertension, and hyperlipidemia.

Performance-based Physical Activity Measure

The 6-minute walk test (6MWT) was used as our primary behavioral outcome of fitness. The 6MWT has been widely used as a reliable and valid measure of fitness in healthy (Harada, Chiu, & Stewart, 1999; Harada et al., 2001; Simonsick, Montgomery, Newman, Bauer, & Harris, 2001) and medically compromised (Bittner et al., 1993; Peeters & Mets, 1996; Montgomery & Gardner, 1998) older adults. Participants were instructed to walk around 2 traffic cones on opposite ends of a 40-foot corridor, unassisted, while covering as much distance as possible within the 6-minute time frame. Each lap equaled 80 feet in distance. Following a standardized administration protocol (Peeters & Mets, 1996), the research assistant provided encouragement at fixed intervals during the walk, and recorded the total number of laps completed. At the end of 6 minutes, a marker was placed on the ground next to the subject, and total distance was calculated in feet with a rolling tape measure.

Materials

A Yamax Digiwalker model SW-701 pedometer was used to monitor total daily step counts. The Yamax SW-701 has been found to be sensitive and reliable in recording step counts (Crouter, Schneider, Karabulut, & Bassett, 2003; Schneider, Crowder, & Bassett, 2004; Schneider, Crouter, Lukajic, & Bassett, 2003), even among overweight and moderately obese individuals (Swartz, Bassett, Moore, Thompson, & Strath, 2003).

All participants completed a daily diary in which they recorded their total daily step counts and listed engagement in specific physical activities. Participants in the GS group also had a space to record whether or not they had achieved their daily step-count goal.

A portable digital scale was used to assess weight, and a tape measure against a wall was used to measure height. Body mass index was calculated using the following formula: weight in kg/height in meters².

Statistical Analyses

Initial descriptive analyses compared demographics, body mass index, medical conditions, physical activities (pedometer step counts, 6MWT, CHAMPS), and health-related quality of life (SF-36) for the MO and GS groups. Means and standard deviations (including 95% confidence intervals) were used for continuous variables and percent distributions were used for categorical variables. *T*-tests and Fisher's Exact tests were used to examine group differences in the continuous and categorical variables at baseline. Independent group *t*-tests were used to examine differences in cumulative 6-week step count data.

Our outcome analysis was an intention-to-treat approach, which uses all available longitudinal data and does not eliminate persons with missing assessments. Generalized Estimating Equations was used to determine if the 2 groups had significantly different patterns of change from baseline to 6-week assessment. We believe Generalized Estimating Equations to be the most efficient way to simultaneously examine both longitudinal (time) and group (treatment) effects. We assumed subjects to be a random effect, and for group and time to be fixed effects, in the models. We first tested a group by time interaction model. A significant interaction would imply that the treatment groups differed in their pattern of change over time. In the event that the interaction was not statistically significant, we refit a main effects model with group and time effects. A significant group effect would indicate that, collapsed over time, the groups had statistically different mean values. A significant time effect would indicate that over the 6-week study period, participants changed significantly on the outcome variables (e.g., increased step counts; walked a greater distance on the 6-minute walk). Because this was a randomized design, and the groups did not differ statistically on any of the study variables at baseline, no covariates were used. The level of statistical significance was set at 0.05. We analyzed the data using SPSS (version 18.0) statistical software.

RESULTS

Participant Characteristics

A total of 48 elders were screened for eligibility; 42 met study inclusion criteria, and 36 (86%) were randomized into either the MO group, $N = 19$, or the GS group, $N = 17$. Thirty-two subjects completed the 6-week assessment and the step diary. Four people failed to complete the 6-week assessments and step diaries. Two individuals dropped out from each group, to end up with $N = 17$ in the MO group and $N = 15$ in the GS group with complete longitudinal data. Pilot study completers

and those who did not complete the study did not differ significantly on any demographic, physical activity, or health-related quality of life variable. As shown in Table 1, the MO and GS groups were similar in demographic features, BMI, and prevalence of reported current medical conditions.

Table 1
Participant Characteristics by Total Sample and Group Randomization

	Total Sample (N = 36)	Monitoring Only (N = 19)	Goal Setting (N = 17)	Fisher's Exact Test - t(34)
Female, %	69	68	71	1.00
Married, %	28	26	29	1.00
Age, mean years (SD)	61 (8.9)	61 (8.4)	62 (9.8)	.81
BMI 30 and over, %	69	74	65	.72
BMI, mean (SD)	31 (6.5)	31 (6.8)	30 (6.3)	.61
Some college education, %	56	63	47	.50
Employed, %	14	21	6	.34
Income\$5,000 or less, %	36	37	35	1.00
Medical Conditions, %				
Arthritis/Osteoporosis	47	58	35	.20
Asthma	14	21	6	.34
Cancer	6	5	6	1.00
Diabetes	22	32	12	.24
Heart Disease/Stroke	8	16	0	.23
Hypertension	31	16	47	.07
Hyperlipidemia	22	26	18	.70
1 or more conditions	72	74	71	1.00
2 or more conditions	44	47	41	.75
Medical conditions, mean # (SD)	44 1.5 (1.3)	47 1.7 (1.5)	41 1.2 (1.1)	.26
Current smoker, %	40	39	41	1.00

Between-Group Comparisons on Outcome Measures

Table 2 presents the between-group comparisons on data generated from the step count diaries, 6MWT, the CHAMPS and the SF-36 from baseline to the 6-week assessments. The MO and GS groups did not significantly differ on any measure at baseline. Although the total number of steps across the 6-week trial and the average number of steps per day were all higher in the GS group, these group differences did not reach statistical significance due to the large variability in these indices. Similarly, although GS participants covered a greater mean distance during the 6MWT at the 6-week assessment, this difference did not reach a level of statistical significance. The mean CHAMPS caloric and frequency of activity measures and the SF-36 scores also did not differ by group. A review of the step count data for the GS group noted that, approximately 47% of the time, participants were able to reach their goal of increasing their step counts by 5% from the previous week.

Table 2
Self-reported Step Counts, 6-minute Walk Performance, CHAMPS,
and SF-36 at Baseline and 6 Weeks by Group Status

Measures	Monitoring Only (N = 19)		Goal Setting (N = 17)		
	Baseline Mean (95% CI)	6 Weeks Mean (95% CI)	Baseline Mean (95% CI)	6 Weeks Mean (95% CI)	
<u>Step Counts from Diary</u>					
Steps per day	4760 (2853-6667)	5324 (3026-7622)	4768 (2650-6885)	5986 (3760-8211)	B: $t(30) = -0.01, p = .99$ 6W: $t(30) = -0.44, p = .66$
Total steps for 5 weeks	--	177,677 (103,438-215,915)	--	197,567 (126,955-268,180)	6W: $t(30) = -0.41, p = .68$
Steps per day for 5 weeks	--	5076 (2955-7198)	--	5644 (3627-7662)	6W: $t(30) = -0.44, p = .68$
<u>6-minute Walk</u>					
Total distance in feet	1137 (1028-1245)	1223 (1060-1387)	1094 (995-1192)	1237 (1055-1419)	B: $t(34) = 0.61, p = .54$ 6W: $t(26) = -0.12, p = .91$
<u>CHAMPS</u>					
Caloric expenditure per week in all exercise-related activities	7979 (3773-12186)	9945 (6371-13520)	7475 (2794-12155)	8491 (4457-12525)	B: $t(34) = 0.17, p = .87$ 6W: $t(30) = 0.58, p = .57$
Caloric expenditure per week in moderate-intensity exercise-related activities	3808 (1223-6393)	3736 (1720-5753)	3020 (624-5417)	3527 (993-6061)	B: $t(34) = 0.47, p = .64$ 6W: $t(30) = 0.14, p = .89$

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Table 2, Continued
Self-reported Step Counts, 6-minute Walk Performance, CHAMPS,
and SF-36 at Baseline and 6 Weeks by Group Status

Measures	Monitoring Only (N = 19)		Goal Setting (N = 17)		
	Baseline Mean (95% CI)	6 Weeks Mean (95% CI)	Baseline Mean (95% CI)	6 Weeks Mean (95% CI)	
Exercise activities, # per week	18 (12-24)	28 (18-39)	15 (10-21)	21 (14-28)	B: $t(34) = 0.79, p = .43$ 6W: $t(30) = 1.28, p = .21$
Moderate-intensity exercise activities, # per week	7 (3-10)	13 (6-20)	5 (2-8)	7 (3-11)	B: $t(34) = 0.68, p = .50$ 6W: $t(30) = 1.48, p = .15$
SF-36 Subscale and Component Factor Scores					
Physical Functioning	60 (45-74)	72 (59-84)	72 (61-82)	76 (64-88)	B: $t(34) = -1.40, p = .19$ 6W: $t(30) = -0.60, p = .55$
Role Functioning - Physical	58 (38-78)	69 (48-90)	64 (43-85)	72 (51-92)	B: $t(30) = -0.46, p = .64$ 6W: $t(30) = -0.60, p = .55$
Role Functioning - Emotional	63 (41-85)	58 (37-79)	73 (51-95)	73 (53-93)	B: $t(32) = -0.68, p = .50$ 6W: $t(29) = -0.21, p = .83$
Social Functioning	62 (56-68)	82 (70-93)	63 (55-70)	85 (75-95)	B: $t(34) = -0.15, p = .88$ 6W: $t(30) = -0.02, p = .99$
Bodily Pain	46 (42-50)	45 (40-50)	45 (40-49)	45 (39-51)	B: $t(34) = 0.54, p = .59$ 6W: $t(30) = -0.02, p = .99$
Mental Health	64 (56-72)	65 (55-74)	69 (59-79)	79 (72-86)	B: $t(34) = -0.82, p = .42$ 6W: $t(30) = -2.43, p = .02$
Vitality	51 (43-60)	58 (49-67)	59 (49-68)	66 (58-74)	B: $t(34) = -1.21, p = .23$ 6W: $t(30) = -1.40, p = .17$
General Health	58 (50-67)	61 (49-72)	67 (55-78)	73 (65-82)	B: $t(34) = -1.26, p = .22$ 6W: $t(30) = -1.83, p = .17$
Physical Health Component Score	39 (36-43)	43 (39-47)	42 (39-46)	44 (41-46)	B: $t(34) = -1.10, p = .28$ 6W: $t(30) = -0.18, p = .86$
Mental Health Component Score	46 (41-50)	47 (41-52)	47 (42-53)	53 (48-58)	B: $t(34) = -0.53, p = .60$ 6W: $t(30) = -1.79, p = .08$

Within-Group Comparisons on Outcome Measures

The Generalized Estimating Equations models revealed no significant group by time interactions, indicating no differential change over the 6-week assessments between the MO and GS groups. Main effect models also failed to show group effects for any measure. In contrast, significant main effects of time were detected for many of the measures when the groups were collapsed to conduct within-subjects analyses. Table 3 presents data from the total sample demonstrating a trend level ($p = 0.09$) increase in the average number of pedometer steps per day from baseline to 6 weeks.

Furthermore, Generalized Estimating Equation modeling detected a time effect [Wald's statistic = 10.73, $p < 0.001$], indicating that participants in both groups significantly increased the distance walked on the 6MWT from baseline to follow-up (mean = 106 feet, SD = 169). Additionally, on the CHAMPS, significant increases in the weekly frequency of all exercise activities ($p = 0.01$) and in the number of moderate intensity exercise activities ($p = 0.02$) were observed. Notable increases over time were observed in the SF-36 Physical Functioning ($p = 0.08$), Mental Health ($p = 0.06$), and General Health ($p = 0.09$) subscales. The largest changes were for the Social Functioning scale, which improved more than 20 points in the 6-week period ($p < 0.001$), and for the Vitality scale ($p = 0.007$). The Physical Component ($p = 0.057$) and Mental Health Component ($p = .04$) scores both increased.

Table 3
Time-analysis of Self-reported Step Counts, 6-minute Walk Performance, CHAMPS, and SF-36 at Baseline and 6 Weeks for the Combined Sample

Measures	Baseline Mean (95% CI) (N = 36)	6 Weeks Mean (95% CI) (N = 32)	Time Effect Wald Chi-Square Df = 1, (p-value)
<u>Step Counts from Diary</u>			
Average number of steps per day for baseline and week 6	4763 (3428-6098)	5634 (4117-7151)	2.82 (.09)
<u>6-minute Walk</u>			
Total distance in feet	1116 (1046-1187)	1230.2 (1116-1344)	10.73 (.001)
<u>CHAMPS</u>			
Caloric expenditure per week in all exercise-related activities	7789 (4770-10712)	9264 (6928-11799)	0.85 (.36)
Caloric expenditure per week in moderate-intensity exercise-related activities	3300 (1748-5124)	3638 (2134-5142)	0.05 (.82)
Exercise activities, # per week	17 (13-21)	25 (18-31)	6.02 (.01)
Moderate-intensity exercise activities, # per week	6 (4-8)	10 (6-14)	5.37 (.02)
<u>SF-36 Subscale and Component Factor Scores</u>			
Physical Functioning	65 (56-74)	74 (66-82)	3.02 (.08)
Role Functioning - Physical	61 (47-74)	70 (56-84)	2.38 (.12)
Role Functioning - Emotional	67 (53-82)	66 (52-80)	0.17 (.68)
Social Functioning	62 (58-67)	83 (76-90)	39.41 (.001)
Bodily Pain	45 (43-48)	45 (41-49)	0.05 (.82)
Mental Health	66 (60-72)	71 (65-78)	3.51 (.06)

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Table 3, Continued
Time-analysis of Self-reported Step Counts, 6-minute Walk Performance, CHAMPS,
and SF-36 at Baseline and 6 Weeks for the Combined Sample

Measures	Baseline Mean (95% CI) (N = 36)	6 Weeks Mean (95% CI) (N = 32)	Time Effect Wald Chi-Square Df = 1, (p-value)
Vitality	55 (49-61)	62 (56-68)	7.28 (.007)
General Health	62 (56-69)	66 (59-74)	2.89 (.09)
Physical Health Component Score	41 (38-43)	43 (41-46)	3.61 (.057)
Mental Health Component Score	47 (43-50)	50 (46-53)	4.38 (.04)

DISCUSSION

We investigated the use of pedometers as a simple, inexpensive method for increasing walking in a primary care sample of AI/AN elders. Previous studies with pedometers have found that diary keeping and step-count goal setting are influential factors in increasing physical activity (Bravata et al., 2007; Farmer et al., 2006; Hultquist et al., 2005; Moreau et al., 2001). All elders in our pilot study were given pedometers and diaries to record daily step counts, with approximately half given additional instruction in setting weekly goals to increase their step counts by 5%. Although all elder participants significantly increased their average daily step counts and total number of steps over 6 weeks, contrary to our hypothesis, setting weekly step-count goals did not confer an advantage over those who only monitored their physical activity and daily steps.

A recent study assessed average daily step counts across a 1-week period among AIs participating in the Strong Heart Family Study (Storti et al., 2009). Mean daily step counts for men and women, respectively, across the following age groups were noted: 4561 and 4582 (50-59 years); 4321 and 3653 (60-69 years); and 3768 and 3770 (70 years and older). Significant trends also were found for declining step counts with increasing age and BMI (Storti et al., 2009). Although our small sample size precluded stratifying average step counts by sex and age, our average daily step count of 4763 at baseline appears comparable to that of the Strong Heart Family cohort, with elders increasing their step counts, on average, by 900 steps per day by the end of the pilot study.

Self-reported measures of physical activity and health-related quality of life also failed to reveal any between-group differences. All participants, regardless of group assignment, significantly increased their weekly frequency of all exercise activities and exercise activities of moderate intensity as assessed by the CHAMPS. Furthermore, all participants reported significant improvements on the Social Functioning, Vitality, and Mental Health Composite subscales, with many other scales trending towards significance. These findings support other studies noting that monitoring physical activities can promote meaningful health-behavior changes (Gleeson-Kreig, 2006; Sawchuk et al.,

2008; Speck & Looney, 2001; Stovitz et al., 2005), through increasing awareness of modifiable health habits, providing feedback on progress, and creating an external reminder for personal accountability (Bravata et al., 2007).

We also assessed changes across the 6-week pilot study with the 6MW, a brief, safe, and sensitive measure of physical functioning for both healthy and medically compromised adults that can be easily integrated into health care settings (Enright et al., 2003). Although no between-group differences were found, both groups significantly increased their total distance by an average of 1.25 laps. Both groups traveled an average distance comparable to similar-aged, healthy adults (Sanderson & Bittner, 2006) and other AI/AN Indian elders (Sawchuk et al., 2008) by the end of the pilot trial. Although the present sample size precludes such analyses, future research should examine if any demographic, health, and social variables differentially predict performance on the 6MWT. Greater body mass index, comorbid illness, current smoking status (Enright et al., 2003; Sanderson & Bittner, 2006), and lower levels of education (Sawchuk et al., 2008) have been found to be associated with lower 6MWT performance. The 6MWT can also be re-assessed across time to benchmark improvements and declines in physical functioning, which could be a useful, inexpensive method suitable for use in underfunded community clinics.

In contrast to earlier research (Bravata et al., 2007; Farmer et al., 2006; Hultquist et al., 2005; Moreau et al., 2001), providing additional step-count goal setting did not improve physical activity and walking behavior. Directive prescriptions of exercise intensity and frequency (Duncan et al., 2005), enhancing motivational efforts (Merom et al., 2009), and promoting walking groups (Krieger, Rabkin, Sharify, & Song, 2009) may be useful adjuncts in physical activity trials using pedometers. Hence, increasing the intensity of the intervention through these means could yield greater differences between our MO and GS groups. Furthermore, culturally relevant activity prescription and promotion efforts that enhance socialization may be particularly important for older AI/ANs (Belza et al., 2004; Coble & Rhodes, 2006; Henderson & Ainsworth, 2003; Thompson, Wolfe, Wilson, Pardilla, & Perez, 2003). Populations also vary in personal, social, and environmental barriers to physical activity and exercise (Owen, Humpel, Leslie, Bauman, & Sallis, 2004; Pan et al., 2009), with these barriers often amplified among older and medically compromised individuals (Dawson, Hillsdon, Boller, & Foster, 2007). Older AI/ANs report challenges in establishing and maintaining physically active lifestyles, citing chronic health conditions, restricted access to transportation and recreational facilities, financial difficulties, limited social support, and isolation (Belza et al., 2004). Addressing these barriers through motivational and problem-solving efforts (Krieger et al., 2009; Merom et al., 2009) will be key in order to reach recommended physical activity levels for older adults.

LIMITATIONS

Our pilot study has several limitations. First, we had a small sample size rendering limited power to detect significant between-group differences. Because the study was explicitly a pilot, we did not report extensive data regarding statistical power. However, several outcome variables were trending towards significance, and a larger sample size would have offered greater statistical power to assess the effect of the intervention. Second, both the MO and GS groups received attention, education, and feedback over the course of the study through the use of in-person interviews, telephone calls, and daily activity diaries. We did not include a no-treatment or attention-control condition, and thus changes observed in the present study may have been due largely to the act of self-monitoring, rather than specifically tracking step counts with a pedometer. Demand characteristics, social desirability, measurement reactivity, and monetary incentives can influence physical activity outcomes during randomized trials (Finkelstein, Brown, Brown, & Buchner, 2008; Speck & Looney, 2001; Stovitz et al., 2005). A more refined assessment of the value of pedometers in promoting increased physical activity would require inclusion of a control arm. Third, we did not assess the sustainability of physical activity changes over the longer term (Bravata et al., 2007), though intervention length is not consistently associated with improved health outcomes. Finally, although elders in the MO and GS groups increased their daily step counts by an average of 600 and 1200 steps per day, respectively, the magnitude of this change is modest and still falls short of national benchmarks for daily physical activity levels. Additional factors, such as increasing motivational enhancement, finding ways to reduce or eliminate barriers to physical activity, encouraging walking partners, and prescribing higher step-count goals may be interventions that could further bolster leisure-time physical activity levels. In spite of these limitations, this pilot study contributes to the scant literature examining physical activity promotion efforts among AI/AN elders.

CONCLUSION

Few efforts have examined the promotion of physical activity among AI/ANs in general, and AI/AN elders in particular. Although medical illnesses and disease risk factors are disproportionately high among AI/AN populations, walking can help reverse the trajectory of these negative health outcomes. Walking can easily be promoted and disseminated in primary care and community settings through low-cost methods that address relevant barriers to physical activity and exercise. The longer-term durability of walking promotion programs remains unclear.

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DO AMERICAN INDIAN MASCOTS = AMERICAN INDIAN PEOPLE? EXAMINING IMPLICIT BIAS TOWARDS AMERICAN INDIAN PEOPLE AND AMERICAN INDIAN MASCOTS

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Abstract: Empirical examinations of American Indian (AI) mascots have only recently entered into the discourse of mainstream psychology. The present studies examined implicit attitudes of non-AI people towards AI mascots and the extent to which they are related to attitudes towards AI people. Significant concordance was observed between negative bias toward AI mascots and AI people. Negative AI mascot bias also predicted stereotype-consistent expectations of an AI person. The implications of these findings are discussed.

“American Indians were and are real, but the Indian was a White invention and still remains largely a White image, if not a stereotype” (Berkhofer, 1978, p. 3)

The use of American Indian (AI) mascots has been a controversial issue for over 30 years. In recent years, several organizations, including the American Psychological Association (2005), have called for a discontinuation in the use of these mascots. The universal motive cited by these organizations is the perception that, despite claims that AI mascots are intended to honor AI people, they in truth reflect an erroneous and largely negative representation of AI people. Efforts to support these claims, however, are hampered by the absence of published empirical evidence examining the perceptions of AI mascots by non-AI people (Davis-Delano, 2007).

Many AIs argue that these mascot caricatures do not represent an accurate or favorable representation of AI people. However, it is unclear if non-AI individuals also recognize that these mascot images are poor representations of AI people. For many individuals, AI mascots may represent their only exposure to AI people or images of AI culture (e.g., Bird, 1996; Deloria, 1998; Farnell, 2004; King, 2004; Pewewardy, 1999; 2004; Roppolo, 2003). That is, non-AI people may perceive that AI mascots and AI people are one and the same. The goal of the studies presented in this paper was to empirically explore this idea by examining the implicit attitudes people have towards AI mascots and AI people. In particular, we examined whether there is a positive association between

non-AI people's bias towards AI mascots and their bias towards AI people. If so, it would indicate that these individuals perceive AI mascots as interchangeable with AI people. Further, we examined whether implicit bias toward AI mascots is associated with stereotyping of AI people.

Scope and Nature of AI Mascots

Since the 1970s, several attempts have been made to persuade schools and universities to discontinue the use of AI mascots. Still, it is estimated that nearly 90 colleges and approximately 1,200 high schools in the U.S. continue to utilize AI images and logos (King, Staurowsky, Baca, Davis, & Pewewardy, 2002). AI mascots remain among the top ten mascots for U.S. high schools (Clarkson, 2003). As a result, many AI students attend schools with AI mascots, or confront insults resulting from competition against schools that do (Staurowsky, 2007).

One reason for the continued use of AI mascots is that advocates insist such symbols are intended to honor AIs (Steinfeldt et al., 2010; Strong, 2004). Proponents argue that AI mascots represent positive images of AI people. However, others argue that, regardless of *intent*, such mascots portray AI people in a stereotypic and inauthentic manner (Harvard Law Review, 1999). Similarly, some suggest that the mere presence of AI mascots in schools engenders racially hostile learning environments for AI people (Baca, 2004).

Do American Indian Mascots = American Indian People?

Perhaps one of the biggest concerns regarding AI mascots is that, because AIs may be largely defined by (and socially represented in terms of) mascot stereotypes, AI people have ceased to be perceived as real (King et al., 2002). From the time of first contact with European explorers, AIs have been portrayed fictionally as *barbaric*, *wild*, and *savage*—terms that imply AI people are less than human (Stannard, 1992; cf. Goff, Eberhardt, Williams, & Jackson, 2008). Thus, it could be argued that AIs have existed as mascots for the 500+ year history of this country, and one consequence of AI sports mascots is that they keep AI people allegorically fixed as a kind of “cultural souvenir” preserved in the American identity (Slowikowski, 1993; p. 28).

Because AIs have historically been characterized in figurative rather than factual terms, we suspect that inauthentic portrayals, such as those of AI mascots, represent the default impression of AI people for most Americans. As a result, we contend that the boundary between *American Indian as human* and *American Indian as mascot* has become blurred in American culture (Farnell, 2004). Indeed, some have argued that mascot representations of AI people are so entrenched in American identity that these invented images have become the majority culture's definition of what *being Indian* means (e.g., Deloria, 1998; McDonald & Chaney, 2003; Pewewardy, 1999; 2004; Roppolo,

2003). As a result, efforts to eliminate AI mascots may be experienced by the majority culture as an encroachment on quintessentially American tradition (e.g., Davis, 1993; see also Phelan & Rudman, 2010). Understanding this process helps to explain in part the intense backlash of non-AI people in response to appeals for retiring AI mascot images (see Steinfeldt et al., 2010; Staurowsky, 2007).

Lack of Empirical Research on American Indian Mascots

Despite two decades of persuasive scholarly work on the social implications of AI mascots, the issue has largely remained segregated from mainstream psychology. Undoubtedly, the biggest impediment to the legitimacy of the AI mascot issue is the scarcity of empirical studies in the research literature. Although the topic of AI mascots has received a great deal of scrutiny in recent years, the majority of this attention has been non-empirical. (e.g., Farnell, 2004; King & Springwood, 2000, 2001a, 2001b; Pewewardy, 1999, 2004; Roppolo, 2003; Spindel, 2002; Springwood, 2004; Staurowsky, 2004, 2007; Vanderford, 1996; Wenner, 1993). Consequently, debate about the mascot issue is largely informed by high-profile stories in the popular media, and the reports that have received the greatest attention are also those that defend the continued use of AI mascots (e.g., Sports Illustrated Poll, Price, 2002).

To date, only two sets of studies have empirically examined the negative effects of AI mascots. Fryberg, Markus, Oyserman, and Stone (2008) found that AI youth exposed to stereotypical AI images (e.g., Chief Wahoo) experienced decreased self-esteem compared to youth not exposed to these images. They also found that exposure (versus no exposure) to AI sports mascots resulted in lower achievement-related expectancies in AI college students. These data represent the only empirical illustration of the negative psychological impact of stereotypical mascot images on AI people. Furthermore, Kim-Prieto, Goldstein, Okasaki, and Kirschner (2010) demonstrated that non-AI college students were more likely to show a heightened tendency to stereotype other racial minority groups (i.e., Asian-Americans) following exposure to an AI mascot prime. Although both studies demonstrate the negative consequences of exposure to AI mascots, what remains to be seen is whether AI mascots are indeed construed by non-AI people as positive or negative representations of AI people.

The dearth of empirical investigations on the effects of AI mascots can be attributed in part to the lack of adequate measurement methodology. One of the biggest obstacles for researchers examining prejudice of any kind is the tendency for respondents to downplay prejudicial attitudes on self-report measures. Dovidio (2001) suggested that socially conditioned attitudes, like racial prejudice, operate at a non-conscious level and constitute subtle or implicit forms of racial bias. Such implicit biases present a unique measurement dilemma because they characteristically contain an element of plausible deniability (Dovidio & Gaertner, 2004). In other words, because individuals

are unaware of their implicit biases, they may engage in potentially racist acts (e.g., use insulting AI mascots) and *genuinely* justify them with non-racist explanations at a conscious level (e.g., “We are honoring AIs”). As a result, implicit attitudes of this nature may not be accessible or measurable by traditional self-report methods (Dovidio, Gaertner, Kawakami, & Hodson, 2002).

Measuring Implicit Bias

The difficulty in measuring implicit racial attitudes has been attenuated somewhat by recent advances in research methodology, such as the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998). The IAT is a computerized task that measures implicit or automatic associations between stimuli by examining how quickly certain stimuli are associated with evaluative attributes (e.g., positive or negative). Determination of implicit bias on the IAT is based on the assumption that responses to compatible judgment stimulus pairs (e.g., *snakes-dangerous*) will be more automatic, and hence faster, than for incompatible judgment pairs (e.g., *flowers-dangerous*) because of the greater strength of the conditioned association between the stimuli (Greenwald et al., 1998; Karpinski & Hilton, 2001). Racial attitudes are thought to operate in much the same way (Dovidio, 2001).

In one of the original IAT studies, Greenwald and colleagues (1998) examined pleasant and unpleasant evaluative attributes associated with stereotypical Caucasian and African American names in a sample of Caucasian college students. Response times were significantly shorter when “Black” names were paired with unpleasant attributes and “White” names were paired with pleasant attributes (i.e., compatible judgment categories) than when Black names were paired with pleasant attributes and White names were paired with unpleasant attributes (i.e., incompatible judgment categories). Greenwald and colleagues interpreted the findings as evidence of an implicit negative bias toward African Americans. Numerous IAT investigations have yielded similar results for a host of racial minority groups, including African Americans, Hispanic Americans, Japanese Americans, and Korean Americans (e.g., Amodio & Devine, 2006; Greenwald et al., 1998; McConnell & Leibold, 2001; Ottaway, Hayden, & Oakes, 2001).

OVERVIEW OF THE PRESENT STUDIES

The purpose of the present set of studies was to provide an empirical assessment of how AI mascots are perceived by non-AI people. Across two studies, we addressed several questions about the nature of Caucasian individuals’ perceptions of AI mascots and AI people, utilizing both implicit and explicit measurement methods. Our first goal was to determine if non-AI people hold an implicit negative bias towards AI mascots. If such a bias is present, it would challenge the statement that AI mascots are perceived as honorable, positive images. Our second goal was to examine if implicit

AI mascot bias and AI person bias are positively correlated with one another. If such a correlation exists, it would suggest that non-AI people do not perceive a distinct difference between AI mascot images and actual AI people. In other words, they would perceive these two stimuli as essentially interchangeable. Finally, we examined whether negative implicit attitudes towards AI mascots translated into negative perceptions of an AI person.

The present studies are unique in that they provide the first extension of IAT methodology to the topic of AI mascots. Using this measurement tool, we designed two studies to examine if portrayals of AI mascots operate at a similar social-cognitive level as do actual AI people. Study 1 was designed to assess if non-AI participants hold an implicit bias towards AI mascots and towards AI people. This study also examined if there is a relationship between these two measures, such that people who hold an implicit negative bias towards AI mascots hold the same negative bias towards AI people. Study 2 was designed to extend this work by examining if people's implicit bias towards AI mascots can be used to predict stereotypical reactions towards an AI individual.

STUDY 1

The purpose of Study 1 was twofold. First, using the IAT, we examined whether non-AI people hold an implicit bias towards AI mascots. Second, we assessed the degree to which implicit bias towards AI mascots was associated with implicit bias towards AI people.

Method and Participants

Twenty-two Caucasian undergraduate psychology students (12 males and 10 females; 18-25 years of age; $M = 20.3$) from a large university in the southwest U.S. participated for course credit. Participants completed an AI Person IAT and an AI Mascot IAT, in counterbalanced order.

Procedures and Measures

AI Person IAT

The six pleasant words (*love, beauty, happy, miracle, relief, pleasure*) and six unpleasant words (*poison, grief, hatred, rotten, hurt, tragedy*) used as evaluative attribute stimuli in the IAT were selected from Greenwald and colleagues (1998). Stimulus words used to describe people of AI or European American descent (i.e., target concept stimuli) were derived from a survey of 67 (40 female and 27 male) undergraduate psychology students at the same university. This survey asked participants to "List the most common American Indian tribes you can think of that describe people of American Indian descent." The same survey asked participants to "List the most common

European nationalities you can think of that describe people of European American descent.” The six most frequently listed AI tribes (*Cherokee, Navajo, Sioux, Apache, Comanche, Iroquois*) and European nationalities (*English, Irish, German, French, Scottish, Dutch*) were used as target concept stimuli in the IAT.

The AI Person IAT program in the present study was modeled after methodology used in previous studies (e.g., Amodio & Devine, 2006; Greenwald et al., 1998; Ottaway et al., 2001; Rudman & Ashmore, 2007). Once participants were seated at the computer, the experimenter left the room and participants were presented with the following instructions on the computer screen:

For each of several sorting tasks you will be shown words one at a time in the middle of the computer screen. Your task is to sort each item into its correct category as fast as you can by pressing EITHER the ‘D’ key or the ‘K’ key. The categories associated with the ‘D’ and ‘K’ keys will be shown at the top of each screen. Please pay close attention to these category labels – they change for each sorting task!

For one of the sorting tasks you will be classifying words that are either
‘PLEASANT’ or ‘UNPLEASANT’

In the other sorting task you will be classifying words that describe people of either
‘NATIVE AMERICAN’ or ‘EUROPEAN AMERICAN’ descent

The AI Person IAT consisted of three practice blocks and two critical (i.e., test) blocks, each containing 36 trials. Practice blocks introduced participants to the task by requiring them to sort evaluative attributes (e.g., *love, grief*) and target concepts (e.g., *Cherokee, German*) into the correct categories. Critical blocks required participants to sort evaluative attributes and target concepts into either compatible judgment (*European American or Pleasant; Native American or Unpleasant*) or incompatible judgment combined categories (*Native American or Pleasant; European American or Unpleasant*). Presentation of evaluative attributes and target concept stimuli were randomized and presented an equal number of times in each trial block. The presentation of test blocks (i.e., compatible/incompatible) was counterbalanced to control for order effects.

Scoring

Using the most recent IAT scoring algorithm recommended by Greenwald, Nosek, and Banaji (2003), the average difference in mean response latencies (in milliseconds; *ms*) between stereotype-incompatible pairings and stereotype-compatible pairings was calculated. This average difference is reported as *D*, or the overall IAT effect. We chose to use the *D* measure because, compared to other scoring methods, it has been shown to be less susceptible to practice effects and both response

speed and cognitive skill confounds (e.g., Cai, Sriram, Greenwald, & McFarland, 2004; Greenwald et al., 2003). A positive D value indicated that response latencies for compatible judgment pairings were shorter compared to latencies for incompatible judgment pairings.

AI Mascot IAT

The six pleasant and six unpleasant words were identical to those in the AI Person IAT. The initial list of six AI and six Caucasian mascots was determined from a survey of 100 (41 male, 59 female) introductory psychology students at the same university. This survey listed five mascot categories (*Caucasian, American Indian, Gentle Animal, Fierce Animal, and Occupations*) and asked students to generate as many mascots they could for each category. The six most frequently listed AI mascots and the six most frequently listed Caucasian mascots on this survey were initially considered for inclusion as target concept stimuli.

Because the most frequently listed Caucasian mascot from this survey (*Fighting Irish*) contained two words, we decided to replace *Seminoles* (number six on the original AI mascot list) with *Fighting Sioux* to provide consistency in the length of stimulus words (see Greenwald et al., 1998, Experiment 2). Furthermore, one of the top six Caucasian mascots on the original list was *Cowboys*. Because this is the mascot of the university where the study took place, *Mountaineers* (number seven on the original Caucasian mascot list) was substituted to minimize the potential for a positive bias confound. The final list of AI mascots used as target stimuli consisted of: *Chiefs, Redskins, Indians, Warriors, Braves, Fighting Sioux*; the six Caucasian mascots were: *Celtics, Mountaineers, Pirates, Vikings, Rebels, Fighting Irish*. Instructions and procedures for completing the AI Mascot IAT were identical to those in the AI Person IAT. The only difference was that participants read:

For one of the sorting tasks you will be classifying words that are either

‘PLEASANT’ or ‘UNPLEASANT’

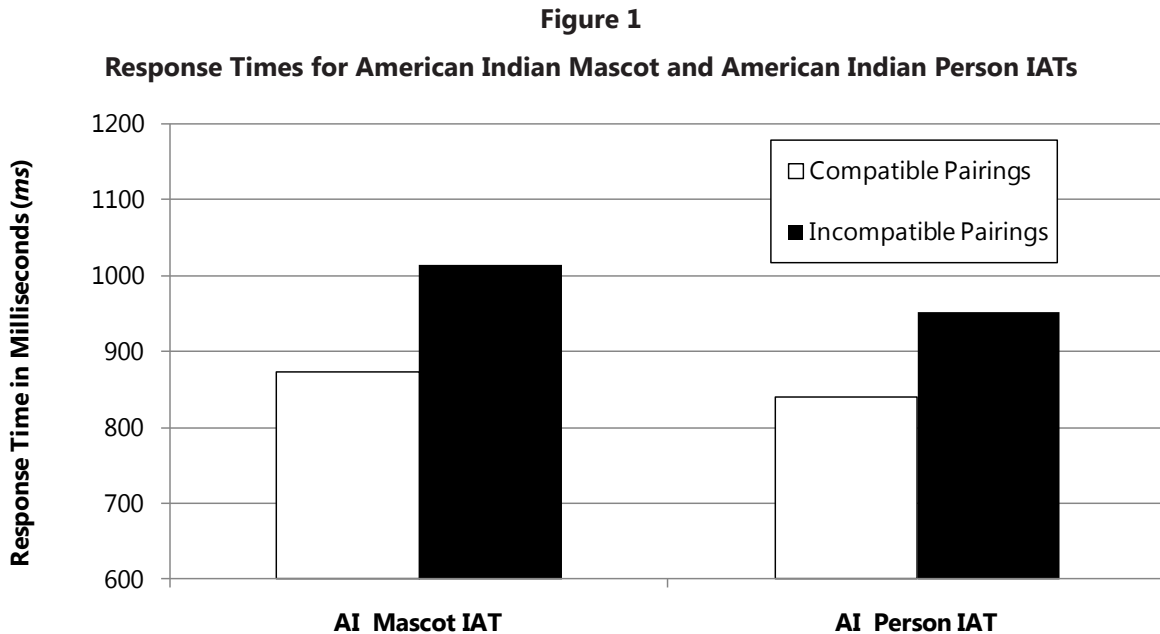
In the other sorting task you will be classifying names of sports teams that are either

‘NATIVE MASCOTS’ or ‘CAUCASIAN MASCOTS’

Results and Discussion

Internal consistency analyses resulted in coefficients of .71 ($p = .01$) for the AI Person IAT and .69 ($p = .01$) for the AI Mascot IAT. The ANOVA on the AI Person IAT revealed shorter response latencies for compatible judgment categories (*European American or Pleasant; Native American or Unpleasant; 840 ms*) compared to incompatible judgment categories (*Native American or Pleasant;*

European American or Unpleasant; 951 ms), $F(1, 20) = 7.80, p = .01, D = .18 (\eta^2 = .28)$ (see Figure 1). This pattern indicated that most participants in our sample held a negative implicit bias towards AI people relative to Caucasian people.



Similarly, the AI Mascot IAT results revealed shorter latencies for compatible categories (*Caucasian Mascot or Pleasant; Native Mascot or Unpleasant; 872 ms*) compared to incompatible categories (*Native Mascot or Pleasant; Caucasian Mascot or Unpleasant; 1014 ms*), $F(1, 20) = 9.16, p = .007, D = .19 (\eta^2 = .31)$. This pattern indicated that most participants in our sample held a negative implicit bias towards AI mascots relative to Caucasian mascots. Thus, at a non-conscious level, our participants were more likely to associate AI mascots than Caucasian mascots with negative words. This calls into question the idea that AI mascots represent positive imagery of AI people.

Importantly, correlation analyses revealed that AI Person IAT performance (D) was significantly associated with AI Mascot IAT performance ($r = .68, p = .001$). Further, an analysis of covariance (ANCOVA) indicated that the AI Mascot IAT effect (D) was no longer significant after controlling for the influence of AI Person IAT D scores, $F(1, 20) = 1.18, p = .31$. Thus, implicit bias toward AI people was positively correlated with implicit bias toward AI mascots. Moreover, the results indicate that a significant portion of the observed AI mascot bias was accounted for by AI person bias, suggesting that implicit evaluations towards AI mascots operate from similar implicit negative evaluations towards AI people. These results suggest that people in our sample did not distinguish between their feelings toward AI mascots and their feelings toward AI people. AI mascots were perceived as essentially equivalent to AI people.

STUDY 2

The results of Study 1 suggest that non-AI people perceive AI mascots as interchangeable with AI people. Although demonstration of this cognitive association is important, the larger issue is whether this association does in fact result in negative consequences for AI people. Study 2 was designed to test this possibility. Specifically, Study 2 sought to extend these results by examining if people's implicit stereotype bias towards AI mascots can be used to predict their stereotyping of an AI individual. If non-AI people perceive AI mascots and AI people as interchangeable, then we would expect individuals with a negative stereotype bias towards AI mascots to also demonstrate this negative bias when making judgments about an AI individual. To test this possibility, we examined whether people with a negative implicit bias towards AI mascots would be more likely to negatively stereotype a fellow AI student.

Method and Participants

Participants were 42 (25 male, 17 female) Caucasian students recruited from undergraduate psychology courses at the same university. Participants ranged in age from 18 to 31 ($M = 21$, $SD = 2.6$). The majority of participants had a parent with a college degree (47.6%). Additionally, 28.6% of participants had a parent with a post-graduate degree, 19% had some college, 31% completed high school, and 2.4% had a parent complete middle school.

Procedures and Measures

The procedures and materials used in this study were modeled after a commonly used measure of stereotypical judgments (Amodio & Devine, 2006; Study 3). The study consisted of two sessions that were spaced two weeks apart. Participants completed the independent variable measures during the first session and completed the dependent variable measures during the second session.

Session 1

Participants first completed a demographics questionnaire that assessed their age, gender, race, and socioeconomic background. Next, participants completed an attitude survey and an IAT task. The order of these two measures was counterbalanced, with half of the participants completing the attitude survey before the IAT, and half completing it after. Following completion of the first session of the study, they were scheduled for the second session and released.

Attitudes survey

One concern regarding the results from Study 1 was that people who held a social aversion to the *use* of AI mascots would demonstrate a negative IAT bias indistinguishable from those who

instead held a negative bias towards AI mascots, per se. To address this concern, we embedded a single item (“The use of Indian mascots is offensive”) into a larger self-report measure of general attitudes towards various social issues (e.g., affirmative action). Responses were made using a rating scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*. Participants were eliminated from the primary analyses if they reported that they either *agree* or *strongly agree* (4 or 5 on the scale) that the use of AI mascots is offensive. This was done to decrease the probability of negative emotions being detected by the IAT that were due to participants’ perceptions of AI mascots as a socially offensive practice.

AI Mascot IAT

Because this study was concerned with stereotyping, rather than general negative attitudes, we created a different version of the IAT. Unlike the IAT in Study 1, which assessed people’s general negative or positive feelings towards AI mascots, this study used an IAT that assessed people’s negative or positive *stereotypes* of AI mascots that were based on typical descriptors of AI people. In this way we could examine the extent to which stereotypes of AIs are implicitly associated with AI mascots.

These stereotypical attributes were determined from two separate surveys pre-tested on introductory psychology students at the same university. The first survey was given to 125 students and consisted of 48 stereotypes that could be used to describe a person. The stereotypes included an equal number of both positive and negative attributes. Respondents were instructed to circle the words on the list that best described stereotypes of AIs. The second survey, given to 40 students, comprised the most frequently chosen negative stereotypes and least frequently chosen positive stereotypes of AIs from the first survey, as well as an additional stereotype (*educated*) from Amodio and Devine (2006). Participants rated the favorability of each stereotypical trait on a Likert scale ranging from 1 = *low* to 7 = *high*. Results indicated that the six most unfavorable traits were *worthless*, *freeloader*, *fat*, *poor*, *lazy*, and *dirty*, and the six most favorable traits were *smart*, *healthy*, *responsible*, *educated*, *clean*, and *successful*.

The basic structure of the IAT task in Study 2 was identical to the AI Mascot IAT used in Study 1; however, instead of using evaluative words to assess general positive or negative associations with mascots, this IAT used specific stereotypes derived from pre-test surveys to assess stereotypical associations with mascots. The six AI mascots and six Caucasian mascots were the same as those used in Study 1.

Session 2

Twenty-seven participants returned to complete their individual second session. The returning participants ranged in age from 18 to 31 ($M = 21$, $SD = 2.8$). They were informed that the purpose of the study was to examine how well they work on tasks as individuals and with a partner. Following a procedure similar to Amodio and Devine (2006; Study 3), participants were led to believe that they would be interacting with a same-sex AI partner on tasks involving tests of academic (verbal and mathematic) and nonacademic (general culture and environmental issues) knowledge. The purpose of this task was to assess whether the non-AI participants would judge their AI partner in a stereotypical manner.

When participants arrived, the experimenter informed them they would be completing paperwork separately from their partner and gave them the name of their partner. Participants were informed that, while they waited for their partner to arrive, they could start on the first part of the task.

Next, participants were given the following instructions:

We're studying people's abilities to cooperate with another person on some tasks assessing different types of general knowledge. You and a partner are going to complete a set of tasks, and then your combined score on these tasks will be compared with other teams who are in this study. You should try your best on these tasks, because the teams with the top five combined scores will be entered into a drawing for \$100 each.

The experimenter then exited the room ostensibly to see if the partner had arrived while participants rated their own abilities in various areas, including math and verbal skills, and their knowledge of general cultural and environmental issues. After a few minutes had passed, the experimenter returned to the room and told participants that their partner had arrived and was completing his/her questionnaires. Participants were then given a personal information sheet with the partner's name (Joe Tallchief/Joanna Tallchief), race (AI), age (19), and year in school (sophomore). Participants were asked to provide their own personal information underneath the partner's information.

The experimenter then commented that the session was running behind schedule and gave the following instructions:

To save time, I'm going to have you decide which tasks you'll do and which your partner will do. Then we'll all go to the main testing room. Remember, you want to choose tasks for yourself and your partner that will give you the best combined score,

not just so that only you or he/she will do well. There are 2 different tasks consisting of academic and nonacademic knowledge: One has questions from the math SAT and verbal SAT, and the other has questions about general cultural knowledge and environmental issues.

Participants were then asked to rate their expectations of their partner's enjoyment on these four tasks (i.e., math test, verbal test, cultural knowledge test, and environmental issues knowledge test). Ratings were made using a scale ranging from 1 = *not at all* to 9 = *very much*. Ratings for the math and verbal tasks ($r = .44, p = .02$) were averaged to create a stereotype-inconsistent composite score; ratings for the culture and environment items ($r = .78, p = .001$) were averaged to create a stereotype-consistent composite score. Participants were then debriefed for both sessions of the experiment and were given a full explanation of the experiment and procedures before being dismissed.

RESULTS

IAT Results

Forty-two participants arrived for the first session of Study 2. Seven of these participants answered *agree* (rating of 4) or *strongly agree* (rating of 5) to the question, "The use of Indian sports mascots is offensive" and were removed from all primary analyses, resulting in a final sample size of 35 for Session 1.

The AI Mascot IAT results from the first session indicated that response latencies were significantly faster for compatible judgment combinations (876 ms) compared to incompatible judgment combinations (1030 ms), $F(1,33) = 21.2, p = .001 (D = .20, \eta^2 = .38)$. Thus, similar to Study 1 results, most participants were more likely to implicitly associate negatively stereotypical words with AI mascots relative to Caucasian mascots.

In the sample of participants who returned for the second session of Study 2 ($n = 27$), results also indicated a negative implicit bias toward AI mascots relative to Caucasian mascots ($D = .14, \eta^2 = .30$), $F(1, 25) = 11.4, p = .002$. Response latencies were significantly faster for compatible judgment pairings (891 ms) compared to incompatible judgment pairings (1012.6 ms).

Stereotypical Expectations Results

Implicit negative stereotyping of AI mascots on the IAT was not related to greater perceived partner enjoyment on the stereotype-inconsistent tasks (i.e., mathematics, verbal), $r = -.07, p = .72$. However, this implicit stereotype bias was related to greater perceived partner enjoyment on the stereotype-consistent tasks (i.e., culture, environmental issues). Pearson's zero-order correlation revealed a significant relationship between biased AI Mascot IAT performance (D) and expected partner enjoyment on non-academic tasks, $r = .39, p = .04$.

GENERAL DISCUSSION

The present set of studies utilized the IAT (Greenwald et al., 1998) to examine implicit attitudes toward AI mascots, AI people, and the connection between these two. Similar to other IAT studies that focused on bias towards African Americans or women (e.g., Amodio & Devine, 2006; McConnell & Leibold, 2001; Nosek, Greenwald, & Banaji, 2005; Ottaway et al., 2001), Study 1 demonstrated that non-AI individuals hold a negative implicit bias toward people of AI descent, relative to people of European American descent. Furthermore, Study 1 extended the use of the IAT to the topic of sports mascots, and demonstrated that non-AI individuals also hold a negative implicit bias toward AI mascots, relative to Caucasian mascots. Study 1 also demonstrated a significant link between AI mascot and AI person bias among participants. Importantly, after controlling for participants' negative bias on the AI Person IAT, the AI Mascot IAT bias effect was no longer present.

The demonstration of a negative bias towards AI mascots is important because it casts doubt on the claim that such mascots genuinely exist as positive characterizations of AI people and culture. Despite outward claims that AI mascots reflect honorable representations of AI people, our data reveal that non-AI people tend to evaluate AI mascots more negatively than Caucasian mascots on an implicit level. Furthermore, the fact that we found a robust relationship between implicit bias towards AI mascots and AI people in Study 1 indicates that AI mascot names serve the same function as actual names of AI tribes in eliciting negative attitudinal biases. Given this strong negative bias that non-AI people have towards both AI mascots and AI people, it is difficult to defend the use of AI mascot images as truly positive, honorable representations of AI people.

Importantly, Study 2 demonstrated that this automatic association between AI mascots and AI people can result in negative consequences for AI individuals. Specifically, this study showed that people's level of implicit bias towards AI mascots in fact predicts how they will perceive an AI partner. Results demonstrated that participants with a negative stereotype bias towards AI mascots were more likely to assume their AI partner would enjoy non-academic tasks (i.e., cultural and environmental tasks). Thus, people who held a stronger negative bias towards AI mascots were also

more likely to perceive their AI partner in a stereotypical manner. Although our methodology could have contributed to a negative attitude towards the partner in Session 2, it does not detract from our primary finding. In other words, if our methodology inadvertently created a negative perception toward the partner (e.g., tardiness), it presumably occurred for all participants and therefore would not have covaried with the predictor variables in the study. Taken together, the results of these two studies suggest that people's evaluations of AI mascots and AI people are a function of a common underlying negative bias and result in stereotypical expectations of AI people.

Our explanation of the IAT data suggests a negative implicit bias toward AI mascots; however, alternative accounts deserve consideration. First, it is possible that the shorter response latencies for compatible judgment categories (e.g., *Caucasian Mascot or Pleasant; Native Mascot or Unpleasant*) were due to participants' greater familiarity with and subsequent favorability for in-group (i.e., Caucasian) stimulus items. Although this explanation is plausible, several studies have indicated that the familiarity bias cannot account for the majority of IAT findings (e.g., Dasgupta, Greenwald, & Banaji, 2003; Dasgupta, McGhee, Greenwald, & Banaji, 2000; Ottaway et al., 2001). Further, the mascot stimuli used in the present studies represented the most popular (i.e., most frequently listed) Caucasian and AI mascots derived from a pre-study survey conducted at the same institution with a similar college sample; therefore, it is unlikely that participants listed AI mascots on that survey that were both popular and unfamiliar. It is equally doubtful that the AI mascots generated were familiar to the survey sample but were unfamiliar to the samples examined in the present studies. Thus, it is unlikely that our results merely reflected a positive association with Caucasian mascots due to greater familiarity with the target stimuli.

Second, the nature of the IAT does not allow us to determine whether AI mascots were evaluated negatively in an *absolute* sense, or merely evaluated negatively *relative to* Caucasian mascots. It could be argued that our results reflected positive evaluations of Caucasian mascots in the absence of any negative evaluation of AI mascots. For example, it is possible that both Caucasian and AI mascots were evaluated favorably; however, participants merely evaluated Caucasian mascots more favorably. In other words, although our interpretation (i.e., negative bias towards AI mascots) is supported by the observed IAT effects, it is also possible that a *relative* difference in evaluation of the two types of mascots could have yielded the same results (see Blanton & Jaccard, 2006; Brendl, Messner, & Markman, 2001). Future studies exploring the mascot issue should employ different measures of implicit social cognition that do not utilize complementary categories (i.e., compatible vs. incompatible) and/or do not utilize response latencies to assess automatic associations (e.g., *Affect Misattribution Procedure*; Payne, Cheng, Govorun, & Stewart, 2005, *Go/No-Go Association Test*; Nosek & Banaji, 2001; *Single Category Implicit Association Test*; Karpinski & Steinman, 2006). Because these measures do not rely exclusively on the calculation of response time difference scores

in determining the presence or absence of biased implicit cognition, they allow for a more precise examination of the associative strength between evaluative attributes and individual target concepts.

Regardless of absolute positive or negative evaluation of target groups, however, the relative differences in target evaluation observed in the present studies have important implications. Although we did not assess actual social interactions in this investigation, we did observe a significant association between negative stereotype bias toward AI mascots and stereotype-consistent expectations of a fellow student. In addition, previous studies indicate that relative differences on the IAT are predictive of untoward behavioral transactions between members of racially dissimilar groups (e.g., Amodio & Devine, 2006; Florak, Scarabis, & Bless, 2001; Hugenberg, & Bodenhausen, 2003, 2004; McConnell & Leibold, 2001; Rudman & Ashmore, 2007). Future studies should examine additional behavioral and/or social products of negative implicit biases toward AI mascots.

Finally, we interpreted our data to suggest that the observed negative associations were based on negative evaluations of both AI mascots and AI people based on antipathy or dislike. However, it is also possible that our data reflect egalitarian negative associations emanating from participants' identification with the historical plight and hardships of AIs (cf. Uhlmann, Brescoll, & Paluck, 2006). To illustrate, all implicit measures of social cognition are limited by their ability to ascertain only the sum total of negative and positive associations with target objects. They do not possess the inferential complexity necessary to tell us the specific source of negative affect associated with the target (Payne, Burkley, & Stokes, 2008). Thus, it could be that the negative implicit associations observed across our studies actually represent a negative, albeit egalitarian, association on the part of participants between AIs and historical oppression, subjugation, and maltreatment.

Although this alternative explanation is feasible, it is unlikely that AI mascots are adopted by non-AI institutions because of a genuine desire to identify with the totality of AI culture and history characterized by genocide, forced removal, and land expropriation (Springwood, 2004). It is more likely that non-AI people genuinely believe they are identifying with AI culture, when in fact they are selectively identifying with inauthentic *pseudo-Indian* imagery (e.g., the noble savage) that emanates from a more romanticized version of the struggles endured by AIs on this continent (King, 2004). This is probably why many people—including the overwhelming majority of participants in Study 2—do not deem the use of AI mascots as offensive and genuinely believe they are honoring AIs with mascot images.

These considerations notwithstanding, the present studies provide empirical evidence of negative implicit attitudinal bias toward both AI mascots and AI people. Indeed, our data revealed consistent tendencies on the part of participants to demonstrate robust negative implicit biases toward AI mascots, relative to Caucasian mascots (Study 1 and 2), even in the presence of favorable explicit evaluation of AI mascots (Study 2). Further, the results indicated that AI person bias accounted

for a significant portion of the observed bias towards AI mascots. Whereas previous research has highlighted the potential negative impact of these mascots on AI people (Fryberg et al., 2008), the present data are unique because they empirically demonstrate that at an implicit level, non-AI people do not perceive AI mascots as positive representations of AI people. Our finding that negative stereotype bias towards AI mascots predicted stereotyping of an AI *person* also suggests that negative attitudinal biases towards these mascot images have meaningful social implications.

Our data also revealed that non-AI people do not perceive a distinct difference between AI mascot imagery and actual AI people—they perceive them in a negative light and as essentially interchangeable. In essence, our data suggest that these AI images are not *just mascots*, but may be emblematic of larger subjugating narratives regarding AI people. Many scholars have argued that AI mascots are so deeply entrenched in American society that, for non-AI people, these inauthentic representations define what it means to be AI (e.g., Farnell, 2004; King, 2004; Pewewardy, 2004). The present studies provide the first empirical evidence to support these claims. Our results indicate that portrayals of AI mascots operate at a similar cognitive level as do actual AI people. For many non-AI people, AI mascots and AI people are one and the same.

This perception that AI mascots are equivalent to AI people may make it difficult for non-AI people to understand the efforts to eliminate these stereotypical mascot caricatures (see Phelan & Rudman, 2010; Staurowsky, 2007; Steinfeldt et al., 2010). Our results offer insight into one reason why non-AI people can be so resistant to the idea of retiring AI mascot imagery. It is our hope that the present studies and further research on this topic will illuminate the social and psychological issues related to AI mascots and will bring a degree of scientific legitimacy to the examination of AI mascots that is long overdue.

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