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Effects of culturally tailored smoking prevention and cessation messages on urban American Indian youth

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ABSTRACT

American Indians (AI) face significant disparities in smoking-related diseases. In addition, smoking prevalence increases exponentially between ages 11 and 18. Smoking prevention and cessation efforts aimed at AI youth therefore are important. In order to strengthen understanding of evidence-based message strategies for smoking prevention and cessation among AI youth. The objective of this study was to test whether a message that was tailored to AI cultural values associated with the sacredness of traditional tobacco can change variables that behavioral theories have identified as predictors of smoking (i.e., instrumental and experiential attitudes, injunctive and descriptive norms, perceived capacity and autonomy, and intention with respect to smoking). We conducted a randomized field experiment among 300 never-smoking and ever-smoking urban AI youth in Minneapolis-Saint Paul between May 18 and July 27, 2019. We used a 3 (message condition: cultural benefits of not smoking cigarettes, health benefits of not smoking cigarettes, comparison message about benefits of healthy eating) × 2 (smoking status: ever-smoked, never-smoked) between-subjects design. Multivariate analysis of variance showed that for ever-smokers, the cultural consequences of smoking message significantly lowered instrumental attitude (partial eta^2 = 0.029), experiential attitude (partial eta^2 = 0.041), perceived capacity (partial eta^2 = 0.051), and smoking intention (partial eta^2 = 0.035) compared to the healthy eating comparison message and the health consequences of smoking message. This was not observed among never-smokers, who already had very negative smoking perceptions. We conclude that messages that tailor to AI culture may be effective tools for discouraging smoking among AI youth.

1. Introduction

The prevalence of cigarette use is much higher among American Indians (AIs) than the U.S. general population (in 2019, 28% versus 17%, respectively, had smoked cigarettes in the past 30 days; SAMHSA, 2019). Furthermore, smoking prevalence among AI youth increases threefold between ages 11 and 18, and smoking is highest among AIs aged 25–44 years (Forster et al, 2008). This underscores that AI youth are at significant risk for smoking initiation during the transition from pre-adolescence to young adulthood. To abate disparities in smoking-related diseases, a focus on youth therefore is an important intervention goal. Unfortunately, effective evidence-based message strategies for smoking prevention and cessation among AI youth are largely absent.

Conventional smoking prevention public service messaging typically emphasizes health consequences and often includes phrases like "tobacco-free." However, traditional tobacco (in contrast to commercial tobacco) has important cultural significance in AI communities (Boudreau et al., 2016; Struthers and Hodge, 2004). When used for ceremonial purposes, tobacco is often put on the ground or water as an offering. It is also burned but its smoke is not inhaled. The smoke represents a sacred communication pathway to the Creator/God. Traditional tobacco can be tobacco, other plants such as red osier dogwood, or a blend of plants. In contrast, commercial tobacco contains thousands of chemicals, many of which have carcinogenic, cardiovascular, and respiratory effects (Talhout et al., 2011). Its use is driven by nicotine dependence. AI communities thus face the challenge of encouraging ceremonial use of traditional tobacco while discouraging recreational and addictive use of commercial tobacco (mainly cigarette smoking). There is a particular need for research that compares messaging that incorporates the sacred use of traditional tobacco with conventional

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anti-smoking messaging about health consequences of smoking cigarettes. Such research can determine whether including references to AI culture is a potentially more effective messaging strategy than conventional anti-smoking messaging for AI youth.

Using references to a particular culture in messaging to members of that culture is known as cultural tailoring (Kreuter and McClure, 2004). Research among AI adults has shown that AI participants desired cultural-specific imagery and narratives in anti-smoking messages (Bosma et al., 2014; Fu et al., 2013). There is some evidence that culturally tailored cessation programs can increase smoking abstinence among AI adults (Choi et al., 2016), although other research did not find such positive effects (Smith et al., 2014). To our knowledge, there is no research that has tested whether cultural tailoring can discourage smoking among AI youth. In addition, it is not known whether culturally tailored messages affect smoking abstinence by improving the factors that such messages were designed to change, namely proximal determinants of smoking behavior. The present project begins to fill this gap.

Positively affecting behavioral determinants of, in this case, smoking is an important goal of cultural tailoring (Hawkins et al., 2008). According to the reasoned action approach (RAA: Fishbein and Ajzen, 2010)—a leading theory of behavior change that has been widely used in health message design—those behavioral determinants are instrumental attitude, experiential attitude, injunctive norm, descriptive norm, perceived autonomy, perceived capacity, and behavioral intention. Applied to smoking, instrumental attitude is an evaluation of one's own smoking in terms of positive or negative attributes (e.g., foolish or wise), and experiential attitude is an evaluation in terms of positive or negative experiences (e.g., pleasant or unpleasant). Injunctive norm is the extent to which a person expects that people who are important to them approve or disapprove their smoking. Descriptive norm is the extent to which a person believes that important referents smoke. Perceived autonomy is the extent to which a person perceives that the decision to smoke is up to them, and perceived capacity is the extent to which the person believes they have the skills to smoke. Behavioral intention reflects one's readiness to smoke, expressed as a perception of the likelihood that one will smoke (Fishbein and Ajzen, 2010). For the sake of brevity, from here on we refer to these variables as "smoking perceptions."

1.1. The present research

We designed a community-engaged experiment to test whether the use of culturally tailored references to the sacred use of traditional tobacco have a preventive effect on never-smoking AI youth and a cessation effect on ever-smoking AI youth by improving smoking perceptions. A minimal requirement for cultural tailoring effectiveness is that a message recipient identifies with the culture to which the message is tailored (Davis et al., 2017). Therefore, we also examine the extent to which AI youth participants identify with AI culture to determine whether culturally tailored messages are in fact culturally relevant.

2. Method

2.1. Design and participants

We designed a between-subjects factor experiment with two independent variables: message condition, which was manipulated (cultural benefits of not smoking cigarettes [culturally-tailored message], health benefits of not smoking [conventional message], benefits of healthy eating [comparison message]) and smoking status, which was measured (ever-smokers, never-smokers). We purposively sampled AI youth aged 12–17 years at nine AI community events in Minneapolis-Saint Paul between May 18 and July 27, 2019 ($N = 300$; over 90% were members of Ojibwe and Dakota tribes; 65.7% female; $M_{age} = 14.23$ years, $SD = 1.42$). Gender distribution was the same in the three message conditions, X^2 (2, $N = 300$) = 0.411, $p = .982$, as was age, $F(2, 297) = 0.765$, $p = .466$. It is unlikely but not impossible that someone could participate at more than one event. Whereas for research purposes it would have been optimal to recruit similar numbers of participants who had and had not smoked, we deemed it unethical to sample participants by smoking status, as this would also disclose their smoking status to their parents/guardians. We therefore identified "ever-smoked" status on the questionnaire after enrollment ("Have you ever smoked a cigarette, even a puff, in your life?"). Of our participants, 36.4% had ever smoked. Participants were randomly assigned to one of the three message conditions: cultural benefits of not smoking (culturally tailored message, $n = 101$), health benefits of not smoking (conventional message, $n = 99$), healthy eating (comparison, $n = 100$). Randomized assignment also produced the same distribution of never-smokers and ever-smokers in the three message conditions, X^2 (2, $N = 294$) = 0.349, $p = .840$. The study was approved by the University of Minnesota's Institutional Review Board.

2.2. Procedures

For all data collection sites, we obtained permission from event organizers prior to scheduling. Research team members who are themselves members of AI tribes approached participants at community events to introduce the study and eligibility criteria (i.e., being an AI youth between 12 and 17, having a parent/guardian nearby to give consent). When someone was interested in participating, their parent/guardian signed a consent form, and the participant signed an assent form. Participants then completed the study using a tablet computer provided by the study team. The study instrument was designed using Qualtrics software, which enabled us to embed the messages in the questionnaire. After a first set of demographic questions, participants saw one of the three randomly assigned messages as a full screen image on the tablet, followed by additional survey questions. Participants could look at the message for as long as they liked. After message exposure, participants responded to questions about identification with AI culture; smoking perceptions; and last, smoking behavior. Participants received a $20 gift card for their participation.

2.3. Materials

Because of their deep understanding of AI culture and expertise in message design addressed to AI communities, our research team's AI members led message development. We first ran a pilot study among 17 AI youth (59% female, $M_{age} = 14.65$ years) to learn which message features were likely to gain sufficient attention. Each pilot study participant viewed 10 print messages that were all addressed to AI youth but that differed in formatting (e.g., text or no text, presence or absence of persons and other imagery). The pilot study found greater attention to messages showing a person whose gender was perceived to be the same as the message recipient. We therefore created two versions of each message: girls received messages that featured a female AI youth, and boys received a message that featured a male AI youth.

We designed two anti-smoking messages: A culturally tailored message, labeled "Keep tobacco sacred," described how not smoking cigarettes is consistent with AI culture, and a conventional message, labeled "Be smoke-free," described health benefits of not smoking. The text in each message was designed such that it was relevant for both ever-smokers and never-smokers. For example, both said "Choose not to smoke cigarettes." In addition, a comparison message about benefits of healthy eating was designed to enable testing whether possible differences between the anti-smoking messages were due to increased effectiveness of the "Keep tobacco sacred" message or decreased effectiveness of the "Be smoke-free" message. The three messages were similar in approach (i.e., all emphasized positive consequences) and format (i.e., all had the same color scheme, background, font, text placement, and similar word count; see Fig. 1).

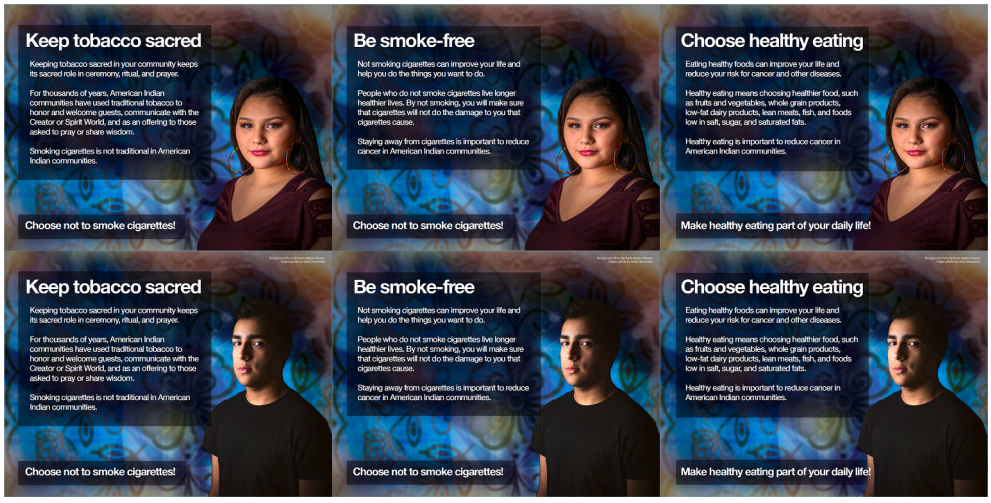

Fig. 1. Messages used in the cultural benefits of not smoking cigarettes condition (left), the health benefits of not smoking cigarettes condition (center), and the healthy eating comparison condition (right), for girls (top row) and boys (bottom row).

2.4. Measures

To ensure that we could stratify results by smoking status, both ever-smokers and never-smokers responded to the same measures that were phrased in terms of smoking cigarettes. The measures are consistent with RAA measurement recommendations (Fishbein and Ajzen, 2010). The construct validity of these measures is supported by RAA research across a range of health behaviors (e.g., Conner et al., 2017; McEachan et al., 2016), as well as by RAA research on smoking cessation (e.g., Dobbs et al., 2020).

Instrumental attitude was measured with three seven-point semantic differential items. The stem "My smoking one or more cigarettes in the next three months would be…" was followed by the items *bad–good, harmful–beneficial*, and *unnecessary–necessary*. Scores on the three items were averaged to yield an indicator of instrumental attitude, $\alpha = 0.89$.

Experiential attitude. Two seven-point semantic differential items measured experiential attitude. The stem "My smoking one or more cigarettes in the next three months would be…" was followed by the items *unpleasant–pleasant* and *stressful–not stressful*. Scores on the two items were averaged to yield an indicator of experiential attitude, $r = 0.53$.

Injunctive norm was measured by asking: "Do you think people who are important to you would approve or disapprove of your smoking one or more cigarettes in the next three months?" (1 = *strongly disapprove, 7 = strongly approve*).

Descriptive norm was measured by asking: "Of the people who are important to you, how many do you think will smoke cigarettes in the next three months?" (1 = *none, 7 = all*).

Perceived autonomy. We used two seven-point semantic differentials. The stem "My smoking one or more cigarettes in the next three months would be…" was followed by the items *not under my control-under my control* and *not up to me-up to me*. We averaged these two items to compute a perceived autonomy scale, $r = 0.77$.

Perceived capacity was measured by asking participants to respond to the item "I am confident that I can smoke one or more cigarettes in the next three months" (1 = *not at all confident,* 7 = *very confident*).

Intention. We asked: "How likely is it that you will smoke one or more cigarettes in the next three months?" (1 = *very unlikely,* 7 = *very likely*).

AI identity. To assess the extent to which participants identified with AI culture, we used two items that were used in previous research (Yzer et al., 2018). Participants responded to the statements "I identify with AI culture" (1 = *strongly disagree*, 5 = *strongly agree*) and "AI culture is a big part of my daily life" (1 = *strongly disagree*, 5 = *strongly agree*). We averaged the scores on these two items to compute an "AI identity" scale, $r = 0.35$.

To probe how participants expressed their AI identity, we used a measure that asked participants which of a number of activities they engaged in (Yzer et al., 2018). Using a "no" and "yes" response format, we asked: "Of these cultural activities, I do: …" followed by (1) traditional dancing, (2) traditional healing, (3) traditional arts and crafts (including beading, quillwork, sewing), (4) traditional use of tobacco for ceremonial prayer or in a spiritual way, (5) traditional storytelling, (6) tribal language learning/teaching, (7) traditional ceremonies/spirituality, (8) traditional sports/games, (9) traditional singing, (10) traditional food gathering, (11) other, and (12) none of these activities.

2.5. Analysis

We used descriptive statistics to summarize correlations, central tendency, and dispersion of the seven smoking perceptions measures and the AI identity measure. To better understand AI identity among our participants, we also tested whether AI identity varied as a function of age and gender, and we used frequency analysis of the cultural activity engagement items to understand how our participants expressed their AI identity.

To test whether culturally tailored messages had a preventive effect on never-smoking AI youth and a cessation effect on ever-smoking AI youth, we designed a 3 (message condition: cultural benefits of not smoking cigarettes, health benefits of not smoking cigarettes, comparison message about benefits of healthy eating) × 2 (smoking status: ever smoked, never smoked) multivariate general linear model (GLM) analysis. The seven smoking perceptions measures were dependent variables.

3. Results

3.1. Descriptive statistics

Table 1 presents means, standard deviations, and correlations between the variables of interest in this study. Smoking perceptions generally correlated moderately to strongly with each other, with the exception of perceived autonomy. AI identity did not correlate with smoking perceptions, indicating that the strength of identification with AI culture did not directly affect smoking propensity in our sample. Except for perceived autonomy, mean levels of smoking perceptions were well below scale midpoints, which indicates that across message conditions and smoking status, smoking perceptions were generally negative.

Table 1
Correlations, means and standard deviations for study variables.

	EA	IN	DN	PA	PC	Intention	AI ID	*M*	*SD*
Instrumental attitude	.696[a]	.384[a]	.237[a]	0.079	.465[a]	.501[a]	0.046	1.56	1.13
Experiential attitude (EA)		.312[a]	.307[a]	.204[a]	.489[a]	.468[a]	0.034	1.95	1.42
Injunctive norm (IN)			.203[a]	−0.102	.308[a]	.219[a]	−0.073	2.12	1.93
Descriptive norm (DN)				.133[b]	.289[a]	.316[a]	0.079	3.70	1.81
Perceived autonomy (PA)					0.023	0.035	−0.006	4.54	2.51
Perceived capacity (PC)						.651[a]	−0.074	1.88	1.71
Intention							0.031	1.75	1.64
AI identity (AI ID)								4.04	0.87

Note. [a] $p < .001$. [b] $p < .05$.

Identification with AI culture was strong, $M = 4.04$ ($SD = 0.87$), and not correlated with age, $r = 0.012$, $p = .833$, or gender, $t(292) = 1.34$, $p = .181$. Participants expressed their AI identity in various ways: 61% engaged in traditional dancing, 25% in traditional healing, 56% in traditional arts and crafts, 49% in traditional use of tobacco (which was not related to smoking status, X^2 (1, $N = 294$) = 0.034, $p = .852$), 19% in traditional storytelling, 48% in tribal language learning/teaching, 44% in traditional ceremonies/spirituality, 39% in traditional sports, 27% in traditional singing, 37% in traditional food gathering, and 15% in other undefined cultural activities. The mean number of activities was 4.19, $SD = 3.09$. These findings underscore the rich array of ways in which AI culture is expressed. They also imply that tailoring to AI culture in our anti-smoking messages is consistent with this sample's generally strong AI identity.

3.2. Effects on smoking perceptions

Message condition effects on smoking perceptions were moderated by smoking status. The GLM showed multivariate main effects of message condition and smoking status, which were qualified by a multivariate message condition × smoking status interaction effect, Wilks' lambda = 0.902, $F(7, 281) = 2.02$, $p = .015$, partial eta^2 = 0.048. Further inspection showed univariate message condition × smoking status interaction effects on instrumental attitude, $F(2, 286) = 4.26$, $p = .015$, partial eta^2 = 0.029; experiential attitude, $F(2, 286) = 6.04$, $p = .003$, partial eta^2 = 0.041; perceived capacity, $F(2, 286) = 7.61$, $p = .001$, partial eta^2 = 0.051; and intention $F(2, 286) = 5.18$, $p = .006$, partial eta^2 = 0.035.

Never-smokers generally had such negative smoking perceptions that these could not be lowered further. Fig. 2 shows that ever-smokers' attitudes, perceived capacity, and intention towards smoking were generally less negative. The cultural benefits message decreased ever-smokers' instrumental attitude, experiential attitude, perceived capacity, and intention: Duncan post hoc tests indicated that the cultural benefits message effects were statistically significantly different from the health benefits and the healthy eating messages, and that the health benefits and the healthy eating messages did not differ from each other.

We ran two additional analyses to better understand our findings. First, previous research found that effects of culturally tailored messages about HPV vaccination were stronger for participants who reported a relatively stronger identification with AI culture (Yzer, et al., 2018). In our data, we did not find that AI identity moderated message condition

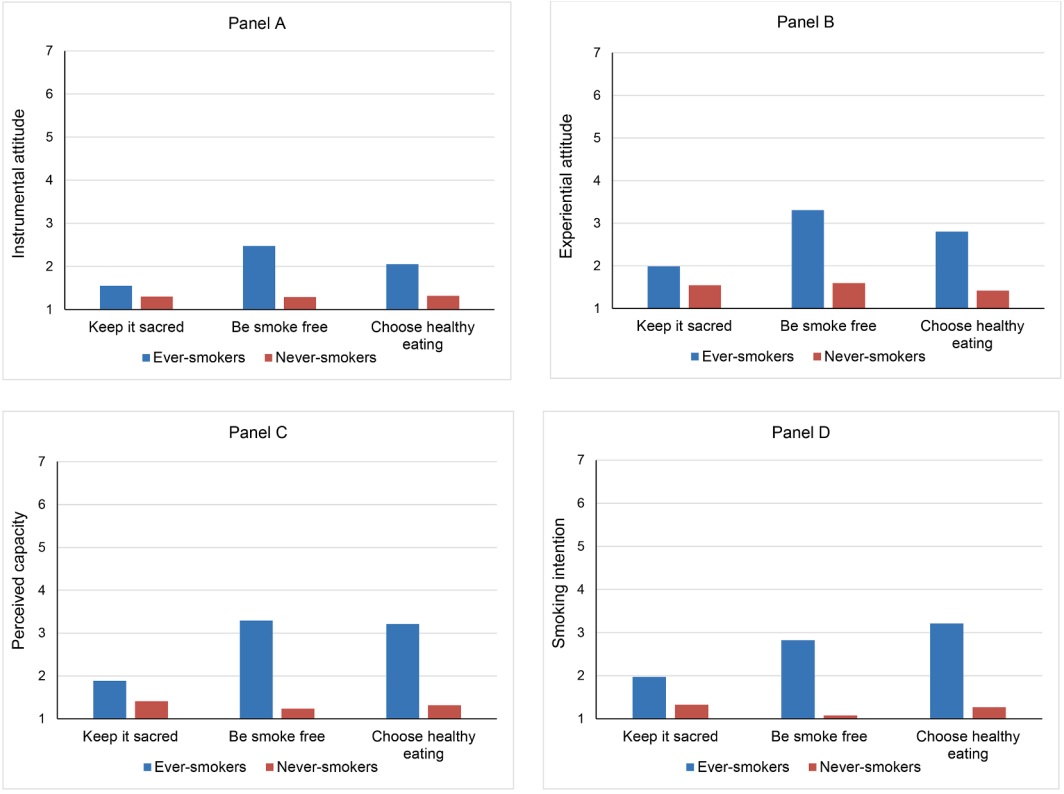

Fig. 2. Message condition × smoking status interaction effects on instrumental attitude (panel A), experiential attitude (panel B), perceived capacity (panel C), and intention (panel D) regarding smoking.

effects, Wilks' lambda = 0.975, $F(7, 281) = 0.50$, $p = .934$, partial eta^2 = 0.012. Similarly, 49% of our participants reported traditional use of tobacco for ceremonial prayer or in a spiritual way, which might affect how participants responded to our cultural messages about traditional tobacco. This was not the case: Traditional tobacco use did not moderate message condition effects, Wilks' lambda = 0.949, $F(7, 281) = 1.06$, $p = .395$, partial eta^2 = 0.026.

4. Discussion

Research among AI adults has shown that they prefer messages that tailor to AI culture and that cultural tailoring may lead to smoking cessation. It is not known, however, whether this generalizes to AI youth, and, if so, which processes might explain cultural tailoring effects on smoking. This study addresses these issues. In summary, our findings suggest that references to AI cultural values may be an effective tool in discouraging smoking among AI youth who smoke or have smoked in the past. Even though ever-smokers in our sample had fairly negative perceptions of smoking, exposure to a culturally tailored message about the sacredness of traditional tobacco further reduced instrumental attitude, experiential attitude, perceived capacity, and smoking intention. In contrast, a conventional message about health benefits of not smoking had the same effects as a healthy eating message that was unrelated to smoking, which indicates that the conventional message did not change perceptions of smoking. These findings are all the more impressive when we consider that our participants were exposed only once, for a brief time, to only one message in non-laboratory settings. Thus, to discourage smoking cigarettes, which has a complex connection with important cultural values surrounding traditional tobacco use, arguments about cultural consequences of smoking may be more persuasive than arguments that do not clearly connect or are inconsistent with AI culture.

Whereas it is promising that we demonstrated that culturally tailored arguments can produce positive effects among AI youth who were current or past smokers, it is equally important to consider that AI youth who had never smoked had such negative perceptions of smoking that no message could further reduce those perceptions. Smoking prevalence among AI youth increases threefold between ages 11 and 18 (Forster et al., 2008), which underscores that AI youth are particularly vulnerable to smoking initiation during their teens. This means that non-smoking AI youth should be a primary intervention target for smoking prevention. The ability of our culturally tailored messages to make smoking perceptions more negative among ever-smoking AI youth plausibly suggests that culturally tailored messages can be used among never-smoking AI youth to reduce smoking initiation vulnerability during their teens. Such a positive behavior reinforcement approach would prime already held anti-smoking beliefs among non-smoking AI youth, which makes those beliefs more important as a basis for the decision to smoke or not smoke (Domke et al., 1998; Harrison et al., 2010).

The findings also shed light on explanatory processes involved in effects of tailored messages on smoking behavior. For example, in one study, a tailored anti-smoking program was associated with smoking abstinence six months later, but it was unclear which mediating variables explained this effect (Choi et al., 2016). Our findings suggest that tailoring may lead to behavioral effects by affecting instrumental attitude, experiential attitude, perceived capacity, and smoking intention. This is consistent with propositions from behavior change theory (Fishbein and Ajzen, 2010) and cultural tailoring scholarship (Kreuter and McClure, 2004).

To ensure appropriate interpretation of our results, we note that the findings may not be representative of all AI youth. First, the sample was limited to one urban area in Minnesota, and most participants were from Ojibwe and Dakota tribes (the primary tribes in Minnesota). Our data do not allow us to argue that our messages will have the same effects among AI youth who live in rural areas and tribal nations. Second, our data collection was done at powwows and other AI community events where attendees likely identified with AI culture. This is important, because positive effects of culturally tailored messages are most likely when message recipients identify with the cultural values that the messages address (Davis et al., 2017; Kreuter and McClure, 2004; Yzer et al., 2018). Note, however, that research among urban AI youth has shown a generally strong identification with AI culture (Brown et al., 2016) and active engagement in cultural activities (D'Amico et al., 2019). Such findings strengthen the confidence we may have in generalizing our findings beyond our sample.

There exist opportunities for future research to probe deeper than our data allowed. Specifically, future research could test a more sensitive smoking status measure that can differentiate between youth who have never smoked, who have smoked in the past but quit, and who are current smokers. Conceivably, message arguments may carry different persuasive weight for those who smoked in the past but have since quit and those who are currently smoking. Also, given that children are more likely to hold relatively positive smoking attitudes and are more likely to smoke when their parents or caregivers smoke (e.g., Wilkinson et al., 2008), it will be useful to test whether the effects of cultural arguments about tobacco are similarly moderated by parental smoking status. Last, we point at a case-category confound as a potential limitation. That is, despite the pilot work we did to inform the development of the messages we used in this study, we cannot know if there is something idiosyncratic to the messages operating here. We therefore advise replication using other versions of these messages that speak to similar themes.

5. Conclusion

Our findings suggest that the use of arguments that positively connect with cultural values about traditional tobacco can be a useful tool for campaign developers who aim to discourage smoking commercial tobacco among AI youth. Our findings are consistent with the literature on cultural tailoring, including at least one study among AI adults in the context of HPV vaccination (Yzer et al., 2018). Research that tests the generalizability of our findings among AI youth in other tribal nations will further bolster confidence in the effectiveness of using culturally tailored arguments in smoking prevention and cessation campaigns that target AI youth.

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CRediT authorship contribution statement

Marco Yzer: Conceptualization, Methodology, Formal analysis, Data curation, Writing – original draft, Visualization, Supervision, Funding acquisition. **Kristine Rhodes:** Conceptualization, Writing – review & editing, Supervision, Funding acquisition. **Rebekah H. Nagler:** Conceptualization, Writing – review & editing. **Anne Joseph:** Conceptualization, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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